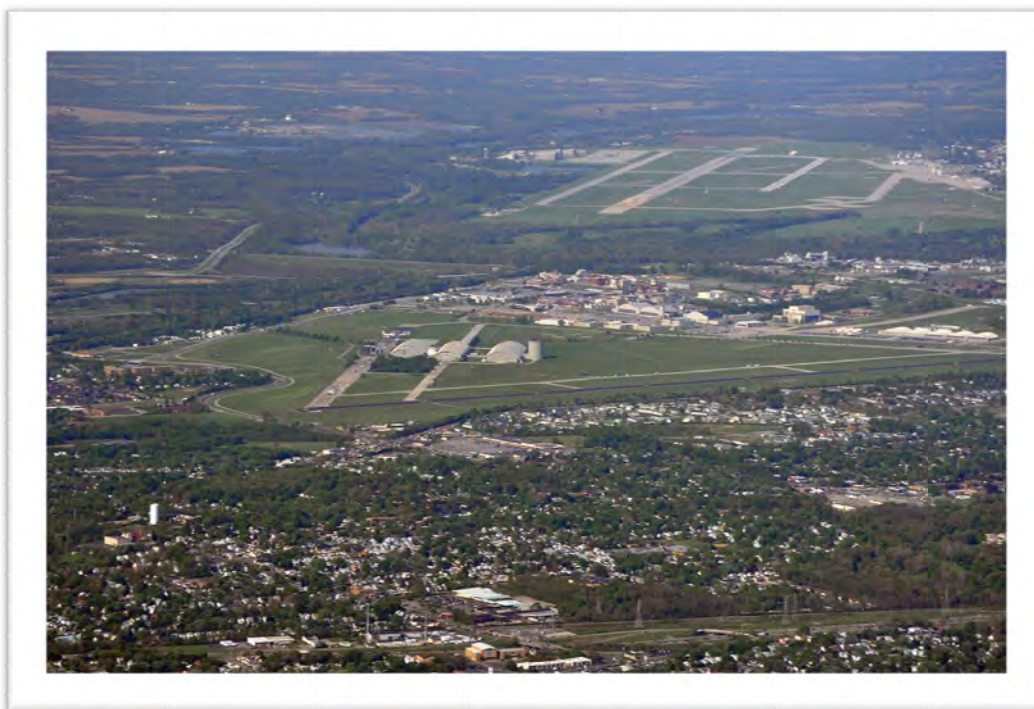


*Final*  
**ENVIRONMENTAL ASSESSMENT  
GLIDE SLOPE/CLEAR ZONE OBSTRUCTIONS  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

**88<sup>th</sup> AIR BASE WING**



**June 2013**



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**FINDING OF NO SIGNIFICANT IMPACT/FINDING OF NO PRACTICABLE  
ALTERNATIVE FOR THE 88<sup>TH</sup> AIR BASE WING  
GLIDE SLOPE/CLEAR ZONE OBSTRUCTIONS  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

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In accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] 4321 et seq.), and pursuant to the Council on Environmental Quality's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] Parts 1500-1508, as of July 1986), and Air Force regulations for the Environmental Impact Analysis Process (32 CFR 989), 88th Air Base Wing (ABW) Civil Engineer Directorate, Asset Management Division prepared an Environmental Assessment (EA) for the glide slope and clear zone obstructions at Wright-Patterson Air Force Base (WPAFB), Ohio. This EA is incorporated by reference into this finding.

**Purpose and Need**

The Air Force identified the need to remove obstacles within the glide slope and clear zones (CZs) at WPAFB in order to protect human health and safety by providing adequate clearance for aircraft operations. The existing vegetative overstory is obstructing the primary surface area, CZs, transitional areas, and glide slopes for both runways at WPAFB. The purpose of the project is to protect human health and safety by removing and pruning vegetation in 18 identified sites located in three distinct areas: Wright Memorial, Riverview, and Sandhill.

**Description of Proposed Action (Alternative A)**

The Proposed Action consists of woody vegetation removal to ground level in all CZs, transitional areas, and glide slopes except at Treatment Sites A (Wright Memorial), G (Sandhill), and J (Sandhill). Pruning vegetation at these sites would involve trimming vegetation to 10 feet (ft) below the Approach-Departure Clearance Surface (ADCS) zone of the glide slope. (See Figure 1-2 of the EA for locations of all treatment sites)

Removal of plant species within CZs, transitional areas, and glide slopes (except Treatment Sites A, G, and J) would be eliminated using appropriate eradication techniques (e.g., cutting of woody plants to ground level followed by chemical application to exposed woody tissue). Cut woody material within all treatment sites (except Sites A, G, and J), would be chipped and distributed over treated areas to a depth of 2 inches followed by application of topsoil and seeded with a perennial grass mix to control erosion. Excess wood chips would be properly disposed of off-Base and any stumps remaining would not be removed.

Pruning treatments in Sites A, G, and J would involve only a chainsaw or other appropriate pruning equipment and no heavy equipment would be allowed to traverse potential habitat areas in Treatment Sites G and J. Vegetation in the glide slope at Treatment Site A would be carefully pruned to maintain a park-like memorial setting using "drop-crotch" (cutting resulting in a more natural appearance, increasing the time before pruning is needed again) pruning methods on less than 20 trees surrounding the Wright Memorial. Cuttings from Treatment Site A would be transported off-Base to an approved area for disposal. Cuttings from Treatment Sites G and J would be transported to other treatment sites for chipping.

**Alternative B**

Alternative B consists of removing woody vegetation to ground level in the CZs at Sites 1A, 2, 3, 5, 6, and 7; and pruning vegetation in the glide slopes and transitional areas (Sites A, B, C, D, E, F, G, H, I, J, K, and 4) to 10 ft below the ADCS of the glide slope and transitional slope. The cutting height would vary with the distance of the treatment area from the runways. Treatment techniques for the removal and pruning methods are as described in the Proposed Action.

### **No-Action Alternative (Alternative C)**

Under the No-Action Alternative, no removal or pruning of vegetative obstructions in the CZs, transitional areas, or glide slopes would occur. No vegetative treatments would occur and vegetation obstructing the glide slopes, transitional areas and CZs would remain in place.

The No-Action Alternative does not meet the USAF's purpose of protecting human health and safety by providing adequate clearance for aircraft operations. The vegetative overstory would continue to encroach the ADCS zone and aircraft approaching and departing WPAFB would continue to be obstructed by vegetative overstory. The No-Action Alternative would not fulfill safety requirements.

### **Alternatives Considered but Eliminated from Further Study**

An alternative that included an obstruction clearing method using a bulldozer was considered early in the analysis process. The felling of vegetation with a bulldozer uproots trees and may cause soil instability, potentially leading to an increase of sediment loading into waterways. Stump removal was also eliminated because ground disturbance would potentially increase sediment loading in waterways. In addition, some of the treatment sites occur at Environmental Restoration Program (ERP) sites where restrictions on digging or excavating in these areas exists. Due to concerns regarding surface water and ERP sites, this treatment technique was eliminated and was not evaluated in detail.

### **Environmental Consequences**

**Land Use (EA Section 4.1):** The Proposed Action would result in no short or long-term adverse impacts because no changes to land use would occur at or surrounding WPAFB. The No Action alternative would have no adverse impact over current conditions.

**Air Quality (EA Section 4.2):** Under the Proposed Action, there would be minor short-term adverse impacts from particulate matter and engine exhaust emissions generated during tree cutting/pruning activities. Impacts would be minor because emissions would be short in duration and are negligible with respect to overall emissions expected in the region. There would be no long-term impacts as trimming/pruning activities would be short in duration. The No Action alternative would have no adverse impact over current conditions.

**Noise (EA Section 4.3):** Under the Proposed Action, there would be minor adverse impacts on ambient noise from tree cutting/pruning activities. Impacts would be minor because equipment use would be intermittent and removal activities would be of short duration. There would be no long-term impacts as trimming/pruning activities would be short in duration. The No Action alternative would have no adverse impact over current conditions.

**Soil Resources (EA Section 4.4):** There would be potential minor adverse impacts during cutting/pruning activities (i.e., soil erosion) as a result of the Proposed Action. Erosion potential at the Wright Memorial area is higher because of soil characteristics. Impacts would be minor because erosion controls would be implemented. There would be negligible long-term impacts to soils, topography, and physiographic features. The No Action alternative would have no adverse impact over current conditions.

**Water Resources (EA Section 4.5):** Under the Proposed Action, there would be minor short-term adverse impacts to surface water runoff during cutting/pruning activities. Impacts would be minor because erosion controls would be implemented. The Proposed Action would not pose any new risks; however, minor adverse effects on groundwater would continue to occur as a result of nearby aircraft operations. Erosion and sedimentation controls would be implemented as a Best Management Practice. There would be no short or long-term adverse impacts because there would be no net loss or gain of soils in the floodplain. There would be no increase in impervious surfaces and there would be no net loss or gain of soil in the retarding basin. The Miami Conservancy District (MCD) was consulted regarding the potential impact the Proposed Action would have on the retarding basin, if any. The MCD responded indicating no objection to the proposed project. The No Action alternative would have no adverse impact over current conditions.

**Biological Resources (EA Section 4.6):** Under the Proposed Action, there would be short-term adverse impacts to vegetation as the proposed activities would involve the loss of approximately 50 acres of trees in the CZs and glide slope areas and partial tree removal within approximately 39 acres of transitional areas. Impacts would be minor because the flora and vegetation known to occur within the project areas are common to the region. Long-term impacts to vegetation involve an increase in tree mortality from removal/cutting in order to meet height restrictions. Short- and long-term adverse impacts to wildlife and threatened and endangered species would be minor due to the transient nature of terrestrial species known to occur in the project areas and the frequent occurrence of these species throughout the region. Long-term adverse impacts to threatened and endangered species would be minor due to the abundance of forest cover within a 0.6-mile radius of potential Indiana bat habitat. The U.S. Fish and Wildlife Service (USFWS) and Ohio Department of Natural Resources (ODNR) have been consulted regarding potential effects on biological resources in the project areas. According to information obtained from the ODNR, the only federally-listed species known to have potential foraging or summer roost habitat in the vicinity of the proposed project areas is the Indiana bat. However, there are less than one dozen potential summer roost trees within the vicinity of the proposed project areas, and none directly occurring within the designated treatment sites. The USFWS concurred with the USAF determination that no adverse effects are likely and that consultation under Section 7(a)(2) of the Endangered Species Act has been satisfied. The No Action alternative would have no adverse impact over current conditions.

**Cultural and Historic Resources (EA Section 4.7):** Under the Proposed Action, no short- or long-term adverse impacts would occur because archaeological sites would be identified in the field and vehicle traffic would be minimized. The State Historic Preservation Office (SHPO) was consulted regarding potential effects the Proposed Action would have on cultural resources. The SHPO concurred that the proposed project would have no adverse effect to historic properties. The No Action alternative would have no adverse impact over current conditions.

**Socioeconomic Resources (EA Section 4.8):** Under the Proposed Action, there would be a short-term negligible adverse effect on the local workforce. There would be a beneficial impact to the local economy in the form of revenue generated by trimming/pruning activities. The No Action alternative would have no adverse impact over current conditions.

**Environmental Justice (EA Section 4.9):** Under the Proposed Action, land use would not change. There would be no short-term or long-term disproportionate impacts to minority or low-income populations. The No Action alternative would have no adverse impact over current conditions.

**Infrastructure (EA Section 4.10):** Under the Proposed Action, there would be negligible short-term adverse impacts from traffic interruption in the project areas during trimming/pruning activities. Impacts would be considered minor because the treatment areas are not in high-traffic areas and the tree removal operations are of short duration. No long-term impacts would result from the Proposed Action because of the short duration of the trimming operations. The No Action alternative would have no adverse impact over current conditions.

**Health and Safety (EA Section 4.11):** Under the Proposed Action, there would be potential minor adverse impacts to workers during trimming/pruning activities. Impacts associated with construction activities would be minimized by adherence to applicable safety standards. The No Action alternative would have no adverse impact over current conditions.

**Hazardous Materials and Waste/Environmental Restoration Program (ERP) (EA Section 4.12):** The Proposed Action would have a negligible adverse impact because hazardous wastes generated during trimming/pruning activities would not be expected to increase and would be handled, stored, transported, disposed of, or recycled in accordance with WPAFB's Hazardous Waste Management Plan. Land Use Controls specified for ERP sites located within the proposed treatment sites would not be compromised by cutting or pruning activities and stumps would not be removed from any treatment site; therefore, no violations to the terms of the Record of Decision would result. The No Action alternative would have no adverse impacts over current conditions.

### **Agency Consultation**

In accordance with NEPA, 42 U.S.C. §4321 et seq. (1969), informal consultation was solicited with applicable agencies to seek input on the likelihood of environmental or other impacts resulting from the development of the Proposed Action. A summary of the outcome of consultation efforts with pertinent agencies is included as Appendix A of the EA.

### **Public Notice**

A public notice was posted in the *Dayton Daily News* on April 16, 2013, and a paper copy of the EA was made available for review at the Fairborn Library. The comment period was held from April 16, 2013 until May 15, 2013. No comments were received during the comment period; however, the WPAFB Office of Public Affairs provided answers to the following questions posed by the *Dayton Daily News*: where to locate a copy of the EA, estimated cost of the project, how the project would be completed, when the project would be executed, and when the last glide slope obstruction project was completed.

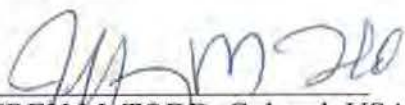
### **Finding of No Significant Impact (FONSI)**

The Proposed Action is to remove woody vegetation and trim and prune trees within the glide slope, transitional areas, and CZs, which will involve mechanized cutting using appropriate tree removal equipment (e.g., shearer, knuckle boom loader with disk saw, chainsaw). The Alternative to the Proposed Action involves vegetation removal to ground level, cutting trees to 10 ft below the ADCS area, and cutting at variable heights based on the distance of the treatment area from the runways. Under the No-Action Alternative, no removal or pruning of vegetative obstructions in the CZs, transitional areas, or glide slopes would occur. No vegetative treatments would occur and vegetation obstructing the glide slope, transitional area and clear zone would remain in place. The No-Action Alternative does not meet the USAF's purpose of protecting human health and safety by providing adequate clearance for aircraft operations. The vegetative overstory would continue to encroach the ADCS area and aircraft approaching and departing WPAFB would continue to be obstructed by vegetative overstory.

Based upon my review of the facts and analysis contained in the EA, which is hereby incorporated by reference, I conclude that the Proposed Action, Alternative B, and the No-Action Alternative will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of NEPA, the President's Council on Environmental Quality, and 32 CFR 989.

### **Finding of No Practicable Alternative (FONPA)**

Taking the above information into consideration, pursuant to Executive Orders 11988, Floodplain Management and 11990, Protection of Wetlands, and the authority delegated by Secretary of the Air Force, Order 791.1, I find there is no practicable alternative to conducting the Proposed Action within the floodplain and wetlands, and that the Proposed Action includes all practicable measures to minimize harm to the environment. This fulfills both the requirements of the referenced EOs and the Air Force Environmental Impact Analysis Process (32 CFR Part 989.14) for a FONPA.



JEFFREY M. TODD, Colonel, USAF, P.E.  
Command Civil Engineer  
Communications, Installations  
and Mission Support

Date: 24 July 2013

# **PUBLIC NOTICE**

## **NOTICE OF AVAILABILITY**

**Wright-Patterson Air Force Base  
Asset Management Division  
Accepting Public Comments on the  
Draft Final Environmental Assessment of the  
Glide Slope/Clear Zone Obstructions**

WRIGHT-PATTERSON AFB - Beginning April 16 through May 15, the United States Air Force will accept comments on the Environmental Assessment (EA) of the Glide Slope / Clear Zone Obstructions at Wright-Patterson Air Force Base (AFB), Ohio. The Air Force is proposing to issue a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) based on the EA. The analysis considered potential effects of the Proposed Action, an Alternative to the Proposed Action, and the No Action Alternative on the following resource areas: land use, air quality, noise, geological resources, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, health and safety, and hazardous materials and wastes.

The results, as found in the EA, show that the Proposed Action would not have an adverse impact on the environment—indicating that a FONSI would be appropriate. In addition, as found in the EA, there are no practicable alternatives to the Proposed Action and negligible impacts to the floodplain, indicating a FONPA would be appropriate. An Environmental Impact Statement should not be necessary to implement the Proposed Action.

The public is invited to review the documents at the Greene County Public Library, Fairborn Branch, located at 1 East Main Street, Fairborn, OH 45324-4701, (937) 878-9383.

Written comments and inquiries on the EA and FONSI/FONPA should be directed to:

Ms. Estella Holmes  
Public Affairs Specialist  
88 ABW/PAO 5735 Pearson Road, Building 10 (Area A)  
Wright-Patterson AFB, Ohio 45433-7626  
(937) 522-0522 [estella.holmes@wpafb.af.mil](mailto:estella.holmes@wpafb.af.mil)

**Final  
Environmental Assessment  
Glide Slope / Clear Zone Obstructions  
Wright-Patterson Air Force Base, Ohio**

**Contract No. W912QR-08-D-0013  
Delivery Order 0011**

**Submitted to:**

**Wright-Patterson Air Force Base  
88<sup>th</sup> Air Base Wing  
Civil Engineering Directorate  
Asset Management Division**

**Prepared by:**

**Shaw Environmental & Infrastructure, Inc.  
5050 Section Avenue  
Cincinnati, OH 45212**

**June 2013**

## COVER SHEET

### FINAL ENVIRONMENTAL ASSESSMENT GLIDE SLOPE / CLEAR ZONE OBSTRUCTIONS AT WRIGHT-PATTERSON AIR FORCE BASE, OHIO

**Responsible Agencies:** U.S. Air Force (USAF); Wright-Patterson Air Force Base (WPAFB), Ohio

**Affected Location:** WPAFB, Ohio

**Proposed Action:** Glide Slope/Clear Zone Obstructions

**Report Designation:** Final Environmental Assessment

Written comments and inquiries regarding this document should be directed to Ms. Estella Holmes, Public Affairs Specialist, 88 ABW/PAO, 5735 Pearson Road, Building 10 (Area A), WPAFB, Ohio, 45433-7626, (937) 522-0522, Estella.Holmes@us.af.mil.

**Abstract:** The 88 Air Base Wing (88 ABW) has analyzed vegetative obstructions within the glide slope and clear zone of Runways 05-23R and 05-23L at WPAFB. According to Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*, the removal of airspace obstacles is required in order to uphold safe standards for WPAFB's airfield. The existing vegetative overstory is obstructing the primary surface area, clear zones (CZs), transitional areas, and glide slope areas for both runways. The purpose of removing obstacles within the glide slope and CZs at WPAFB is to protect human health and safety by providing adequate clearance for aircraft operations.

This environmental assessment (EA) evaluates the Proposed Action, one action alternative to the Proposed Action, and the No Action Alternative. Resources considered in the impact analysis are land use, air quality, noise, geological resources, water resources, biological resources, cultural resources, socioeconomic and environmental justice, infrastructure, health and safety, and hazardous materials and wastes. Analyses in this document identify minor short-term adverse impacts on air quality and noise resulting from the proposed removal and pruning activities related to eliminating glide slope and clear zone obstacles. The EA was made available to the public on April 16, 2013, for a 30-day review period. No public comments were received during the comment period; however, the WPAFB Office of Public Affairs provided answers to questions posed by the *Dayton Daily News*. The questions/answers are provided in Appendix A.

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## LIST OF ACRONYMS

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ABW	Air Base Wing
ACM	asbestos-containing materials
ADCS	Approach-Departure Clearance Surface
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPD	Air Force Policy Directive
AFR	Air Force Regulation
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
APE	Area of Potential Effect
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
AST	above-ground storage tank
AW	Air Wing
BASH	Bird/Wildlife Aircraft Strike Hazard
BHE	BHE Environmental, Inc.
BMP	best management practice
BMP/LTM	Basewide Monitoring Program/Long Term Monitoring
BS4	Burial Site 4
CAA	Clean Air Act
CE	Civil Engineering Directorate
CEANP	Pollution Prevention and Sustainment Section of the Environmental Branch in the Asset Management Division, Civil Engineering Directorate
CEANQ	Environmental Quality Section of the Environmental Branch in the Asset Management Division, Civil Engineering Directorate
CEAOR	Planning and Real Estate Section of the Optimization Branch in the Asset Management Division
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
CZ	clear zone
dB	decibel
dBA	A-weighted sound level measurement
DLSME	Defense Land Systems and Miscellaneous Equipment
DNL	day-night average A-weighted sound level
DoD	U.S. Department of Defense
EA	environmental assessment
EFDZ	earthfill disposal site
EIAP	Environmental Impact Analysis Process
EIFS	Economic Impact Forecast System
EIS	environmental impact statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act

## LIST OF ACRONYMS (continued)

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ESQD	Explosive Safety Quantity Distance
ESZ	Explosive Safety Zone
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft	foot/feet
FTA	Fire Training area
FY	Fiscal Year
GLTS	Gravel Lake Tanks Site
gpd	gallons per day
gpm	gallons per minute
GPS	Global Positioning System
GWTS	Groundwater Treatment System
HAZMART	hazardous material pharmacy
HDC	Hardlines Design Company
HUD	U.S. Department of Health and Urban Development
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
JP-8	Jet Fuel-8
LBP	lead-based paint
LUC	land use control
µg/m <sup>3</sup>	micrograms per cubic meter
MCD	Miami Conservancy District
mg/L	milligrams per liter
mg/m <sup>3</sup>	milligrams per cubic meter
MSA	Metropolitan Statistical Area
MSL	mean sea level
MSW	mixed solid waste
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NO <sub>x</sub>	nitrogen oxides
NO <sub>2</sub>	nitrogen dioxide
NRHP	National Register of Historic Places
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
NSR	New Source Review
NWI	National Wetlands Inventory
O <sub>3</sub>	ozone

## LIST OF ACRONYMS (continued)

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OAC	Ohio Administrative Code
ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
OSHA	Occupational Safety and Health Administration
OU	operable unit
PAH	polyaromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PM <sub>2.5</sub>	particulate matter with an aerodynamic particle size less than 2.5 micrometers
PM <sub>10</sub>	particulate matter with an aerodynamic particle size less than 10 micrometers
POL	petroleum, oils, and lubricants
Ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
RAPCA	Regional Air Pollution Control Agency
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
ROI	region of influence
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SEL	sound exposure level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SOP	standard operating procedure
SPC	Spill Prevention Coordinator
SPCC	spill prevention and control and countermeasures
SR	State Route
SS	Spill Site
SWPPP	Storm Water Pollution Prevention Plan
TCDD	2,3,7,8- tetrachlorodibenzodioxin
TMDL	total maximum daily load
TPH	Total Petroleum Hydrocarbons
tpy	tons per year
TSCA	Toxic Substances Control Act
TSS	total suspended solids
UEC	Unit Environmental Coordinator
UFC	Unified Facilities Criteria
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	U.S. Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency

## **LIST OF ACRONYMS (continued)**

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USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WPAFB	Wright-Patterson Air Force Base

## 1.0 PURPOSE AND NEED FOR ACTION

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This section provides a brief introduction and facility description, a statement of the purpose of and need for the Proposed Action, an overview of the organization of the Environmental Assessment (EA), and a summary of the key environmental compliance requirements.

### 1.1 Introduction

Wright-Patterson Air Force Base (WPAFB) is the nation's most complex and diverse military installation. The Base hosts over 100 tenant organizations and supports an average of 40,000 aircraft operations annually. The 88th Air Base Wing (88 ABW) supports and maintains WPAFB. The current mission of the 88 ABW Civil Engineer Directorate (88 ABW/CE) is to protect human health and safety by providing adequate clearance for aircraft operations.

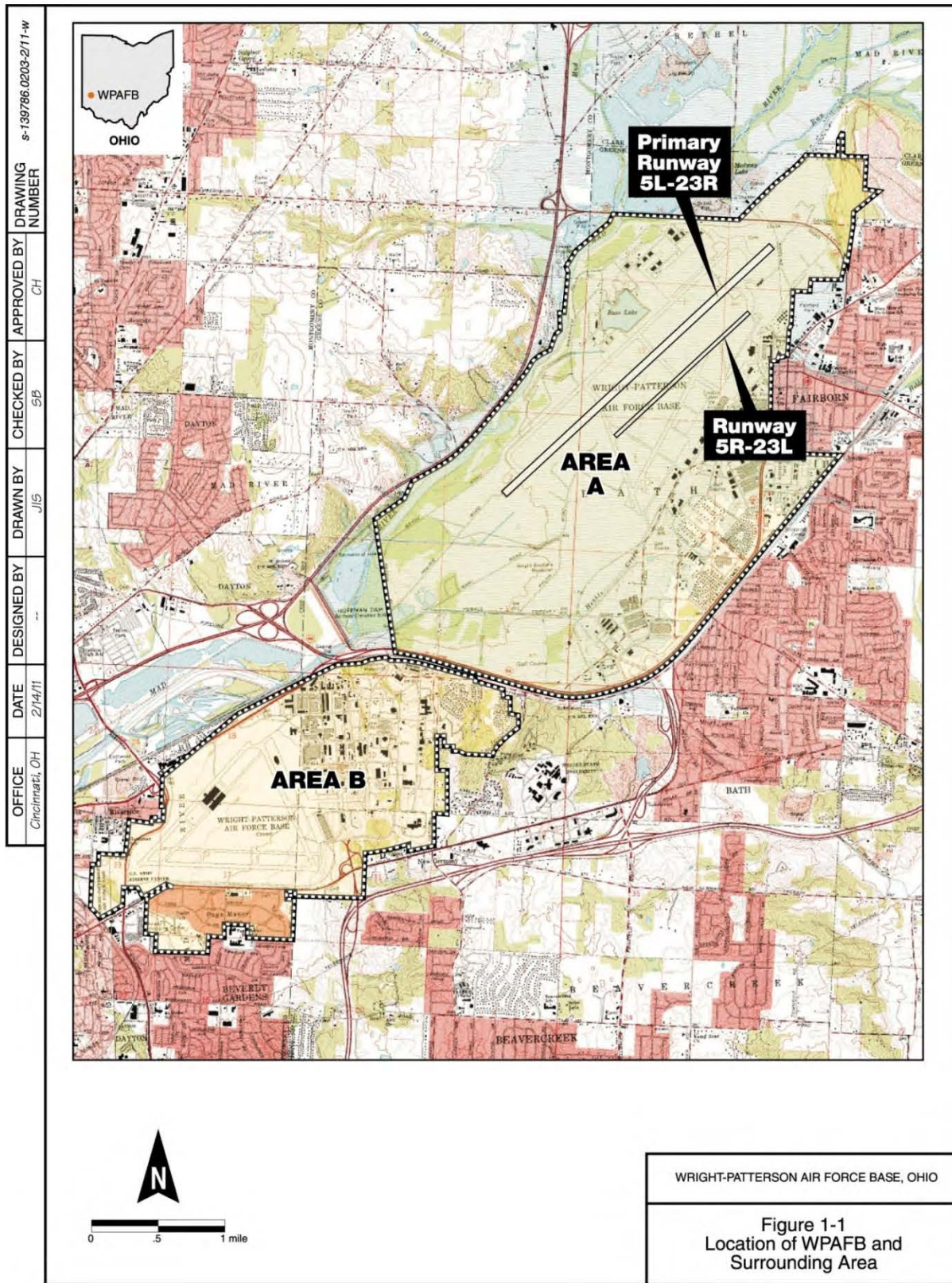
This EA presents the Proposed Action of removing vegetation from 18 areas that are causing obstructions in the clear zone (CZ), transitional area, and glide slope of Runways 05L-23R (23R) and 05R-23L (23L) at WPAFB. The 88 ABW is preparing this EA to analyze the potential impacts from the removal of these vegetative obstructions.

This EA describes and addresses the tree removal and pruning plan of the Proposed Action and alternatives under consideration. If the analyses presented in the EA indicate that implementation of the Proposed Action would not result in significant environmental impacts, a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) would be prepared. A FONSI/FONPA briefly presents reasons why a Proposed Action would not have a significant effect on the human environment and why an Environmental Impact Statement (EIS) is unnecessary. If significant environmental issues result that cannot be mitigated to insignificance, an EIS would be required, or the Proposed Action would be abandoned and no action would be taken.

The 88 ABW has prepared this EA in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; and the United States Air Force (USAF) *Environmental Impact Analysis Process* (EIAP) [32 CFR Part 989].

### 1.2 Facility Description

WPAFB is located in the southwest portion of the state of Ohio in Greene and Montgomery counties, approximately 10 miles east of the city of Dayton. The Base encompasses 8,145 acres and is classified as non-industrial with mixed development. WPAFB is subdivided into two areas: Areas A and B. Area A is primarily administrative offices and an active airfield. Area B is primarily research and development with educational functions and is located across State Route (SR) 444 to the southwest. **Figure 1-1** shows the location of WPAFB and the surrounding area.



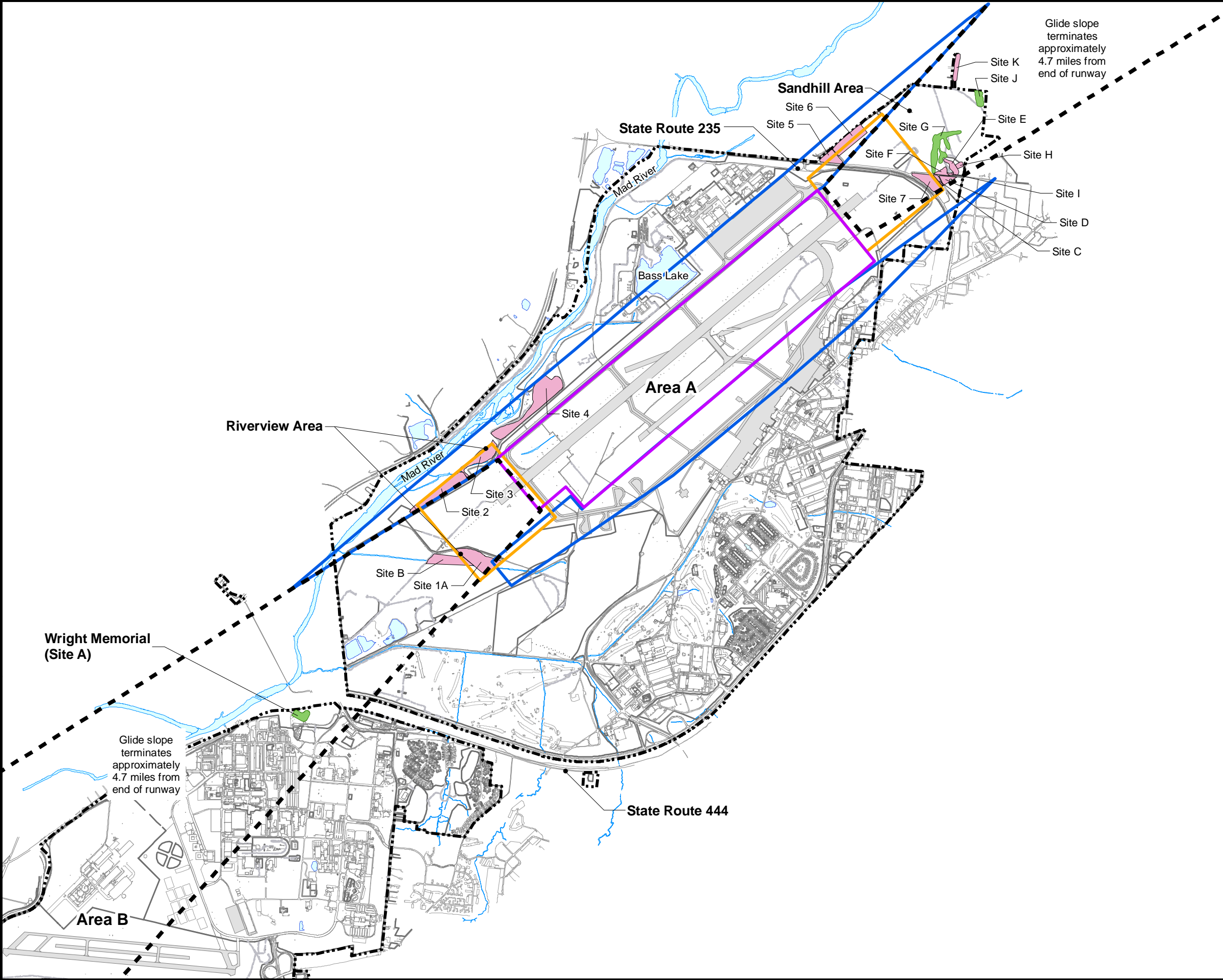
Notes: L=Left; R=Right

Area A contains two active runways, 23R and 23L, which were constructed between 1942 and 1943. The runways are parallel and measure 12,600 feet (ft) and 7,000 ft in length, respectively. Located southeast are Huffman Prairie (largest remnant prairie in Ohio) and Huffman Prairie Flying Field (a National Historic Landmark). Wooded tracts near the runways exist to the southwest and northeast. In the past, vegetative obstructions in the glide slope, transitional area, and CZs were removed intermittently by cutting on a small scale. Currently, vegetative obstructions requiring removal are of a larger magnitude requiring a more detailed assessment to address clearance issues in response to changing requirements.

### 1.3 Purpose and Need

Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*, requires removal of airspace obstacles to uphold safe standards for airfields (DoD 2008). The primary **purpose** of this project is to protect human health and safety by removing and pruning vegetation from 18 identified sites that obstruct the primary surface area, CZs, transitional areas, and glide slope areas for Runways 23R and 23L at WPAFB. (**Figures 1-2 and 1-3**). The identified sites are located in three distinct areas referred to in this EA as the following: Wright Memorial, Riverview, and Sandhill (**Figure 1-2**). The project area airspace zones and imaginary surfaces (surfaces in space established around airfields in relation to runways that are designed to define the obstacle free airspace around the airfield) are defined as follows and are presented in **Figure 1-4** (DoD 2008):

- **Primary Surface Area** – an imaginary surface symmetrically centered on the runway, extending beyond the runway ends, and includes the runway and an area extending 2,000 ft on both sides of the center line.
- **Clear Zone** – areas on the ground located at the ends of a runway. Because CZs possess a high potential for accidents, use is restricted to activities compatible with aircraft operations. Vegetation height in the clear zone should be maintained at ground level. CZs extend 3,000 ft from the end of a runway. The clear zone consists of two distinct areas: graded area and land use control areas. The graded area is the area beyond the runway shoulder where grades are prepared and maintained as an aircraft safety area. The remainder of the clear zone is a land use control area intended to protect people on the ground. The graded area is 1,000 ft in length by the established width of the primary surface and is to be cleared and grubbed of stumps and free of abrupt surface irregularities, ditches, and ponding areas. No aboveground structures, objects, or roadways are permitted in the area to be graded, but gentle swales, subsurface drainage, covered culverts and underground structures are permissible (DoD 2008).
- **Transitional Area** - area parallel to the length of a runway that extends 1,050 ft from the edge of the primary surface area. Safety requirements dictate that no objects may penetrate the surface of the transitional area. The height of this surface is a slope that extends outward 7 ft horizontally to 1 ft vertically (7:1) from the edge of the primary surface area.



### Legend

WPAFB Base Boundary

Glide Slope

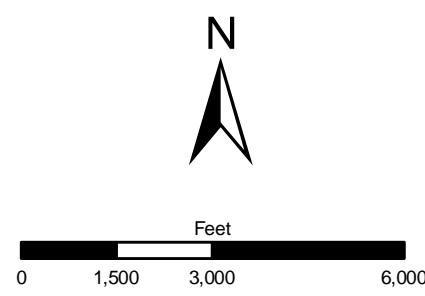
Primary Surface Area

Clear Zone

Transitional Area

Sites A, G, & J = Prune Only;  
Maximum Height 50 feet

Sites B, C, D, E, F, H, I,  
K, 1A, 2, 3, 4, 5, 6, & 7 =  
Remove to Ground Level



WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

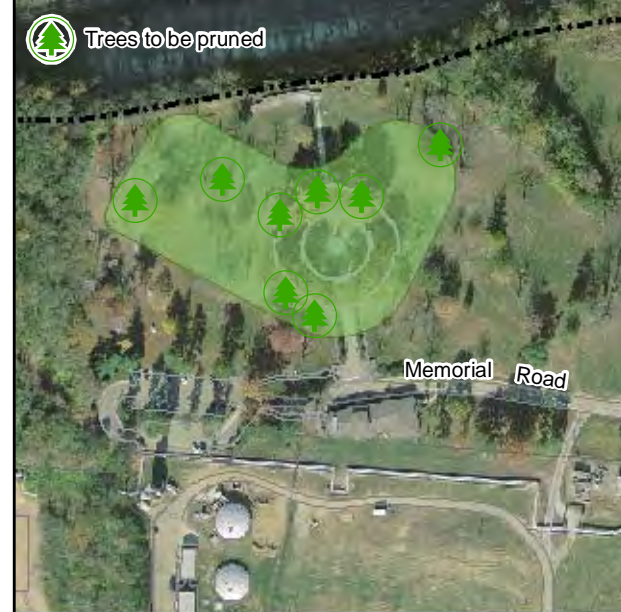
Figure 1-2

Orientation of Clear Zone, Glide Slope,  
Transitional Area, and Primary Surface Area  
in Relationship to Vegetation Removal Areas

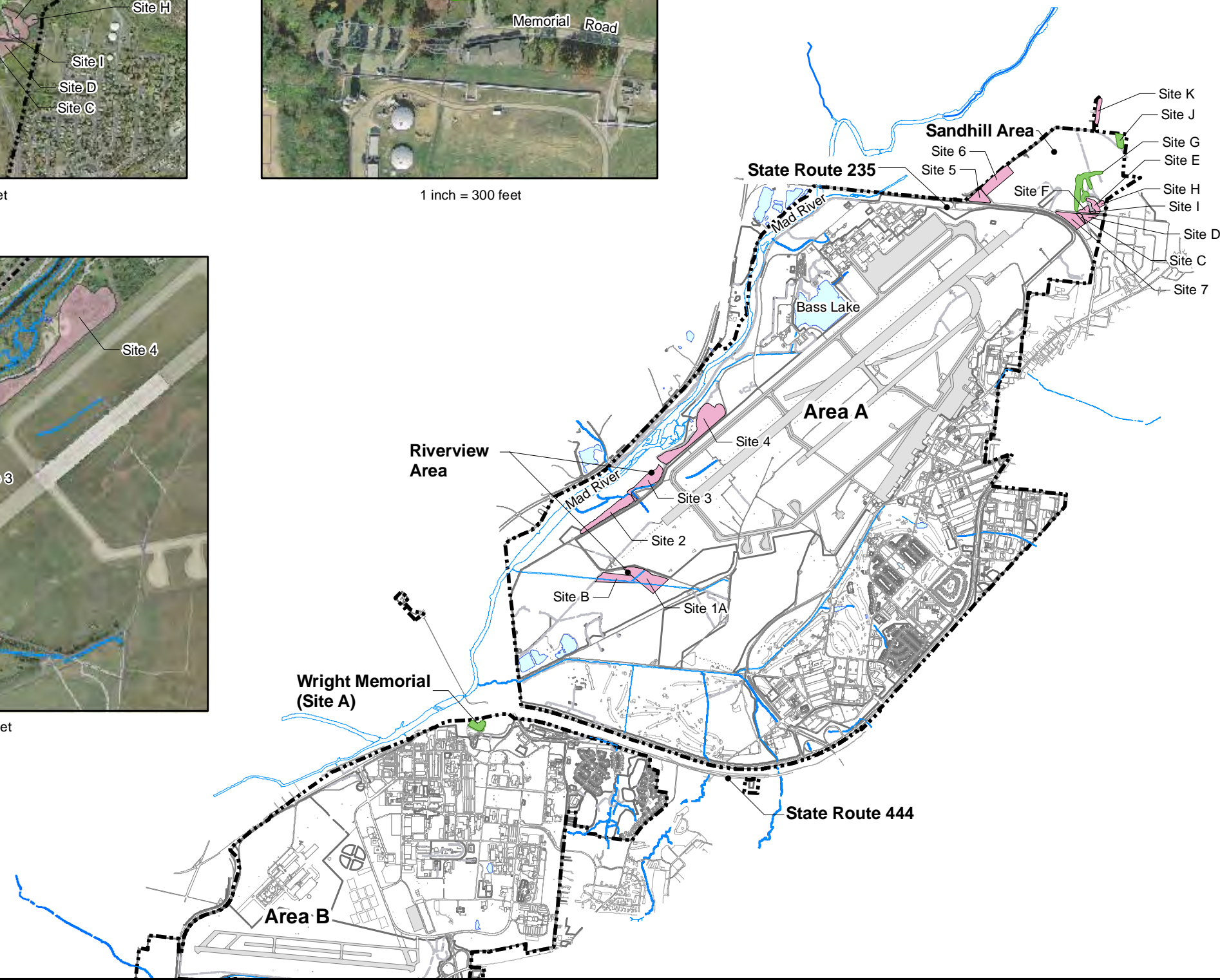
### Sandhill Area



### Wright Memorial Area (Site A)



### Riverview Area



Legend

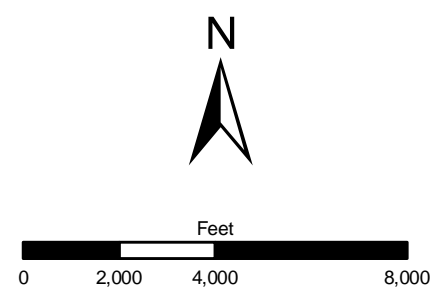
Rivers or Streams

Sites A, G, & J = Prune Only;  
Maximum Height 50 feet

Sites B, C, D, E, F, H, I,  
K, 1A, 2, 3, 4, 5, 6, & 7 =  
Remove to Ground Level

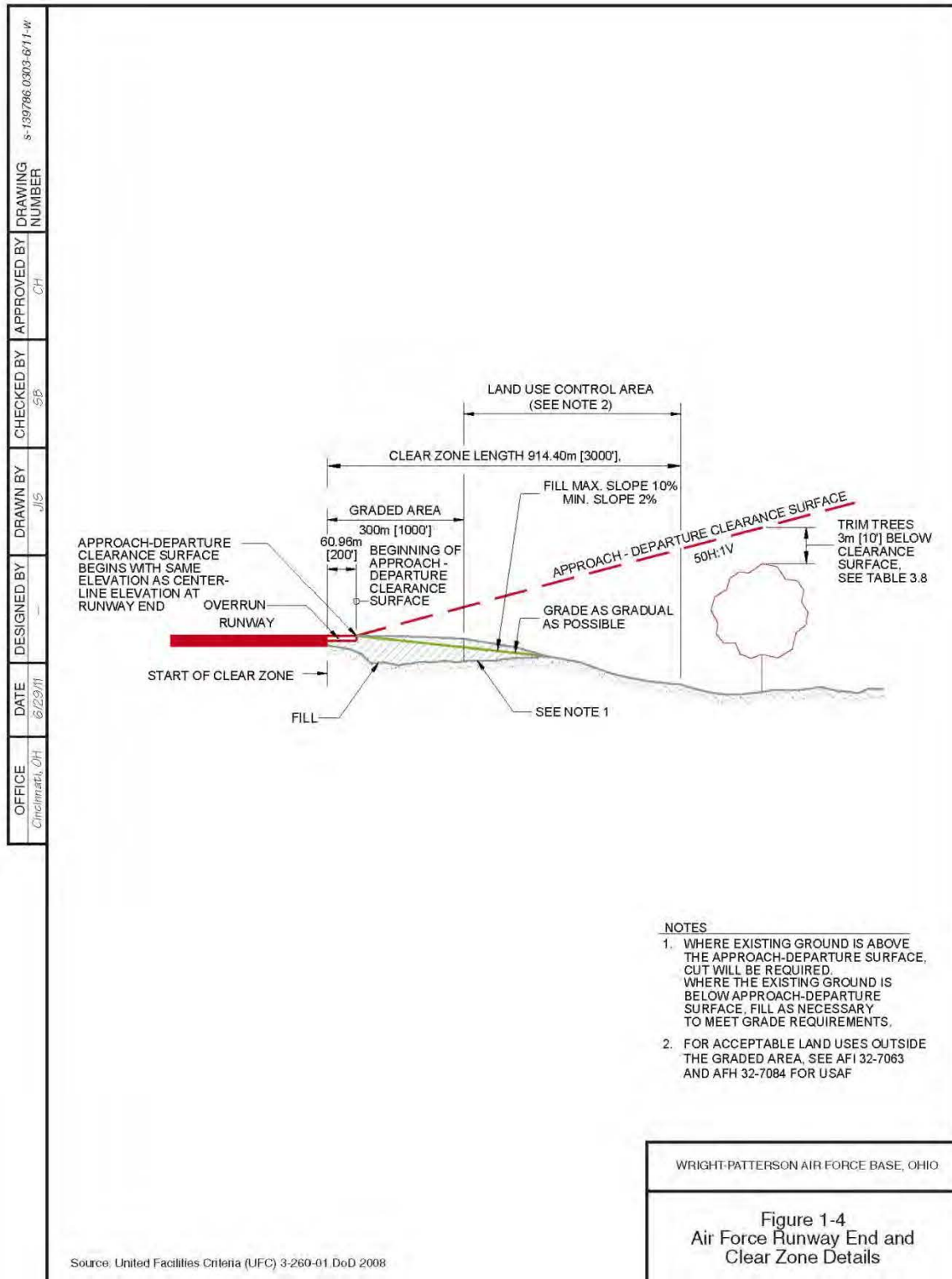
WPAFB Base Boundary

Lakes or Ponds



WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

Figure 1-3  
Location of Treatment Sites



- **Glide Slope** - the path of aircraft approach and departure from runways. The height of this surface is a slope that extends from the end of a runway 50 ft horizontally to 1 ft vertically (50:1) (**Figure 1-4**).

Removing vegetative obstructions is **necessary** to enable adequate clearance for aircraft operations. A field reconnaissance indicated vegetation in the identified 18 sites violates height restrictions, obstructs aircraft operations, and poses danger to human health and safety. The 18 sites range in size from approximately 0.2 to 16 acres and total approximately 90 acres.

#### 1.4 Scope of Environmental Analysis

Consistent with the CEQ regulations, the EA is organized into the following sections:

- Section 1, Purpose and Need for Action, includes a background description, purpose and need statement, EA organization and scope of environmental analysis, and regulatory framework;
- Section 2, Description of Proposed Action and Alternatives, includes a process for alternatives development, alternatives considered, alternatives considered but eliminated, and a comparison of impacts;
- Section 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding WPAFB that may be affected by the Proposed Action or the No Action Alternative;
- Section 4, Environmental Impacts, includes definitions and discussions of direct and indirect impacts, and mitigation and monitoring. The section also includes an analysis of the potential cumulative impacts on WPAFB, unavoidable adverse impacts, the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity, and irreversible and irretrievable commitments of resources;
- Section 5, List of Preparers;
- Section 6, Consultation and Coordination, contains a list of agencies consulted in the preparation of the EA;
- Section 7, References, contains references for studies, data, and other resources used in the preparation of the EA; and
- Appendices, as required.

NEPA, which is implemented through the CEQ regulations, requires Federal agencies to consider alternatives to proposed actions and to analyze impacts of those alternatives. Potential impacts of the proposed alternatives described in this document will be assessed in accordance with the USAF EIAP process, which requires that impacts to resources be analyzed in terms of their context, duration, and intensity. In order to help the public and decision-makers understand the implications of impacts, they will be described in the short- and long-term, cumulatively, and within context.

Environmental issues analyzed in the EA include:

- Land Use;
- Air Quality;

- Noise;
- Geology and Soils;
- Water Resources;
- Biological Resources, including vegetation, wetlands, wildlife, and threatened and endangered species;
- Cultural Resources;
- Socioeconomics;
- Environmental Justice;
- Infrastructure;
- Health and Safety; and
- Hazardous Materials and Waste.

Although all resources are evaluated, the EA will be “issue-driven” emphasizing the resources of most concern to the project. These issues will include land use, water resources, biological resources, air quality, health and safety, and noise and will be particularly emphasized as part of the EA.

## **1.5 Regulatory Framework**

This section describes statutes, regulations, and executive orders that govern and/or influence the scope of this EA. Several statutes were considered but found to have no influence on this project. Although this list is not all-inclusive, the proposed alternatives must comply with all applicable regulatory requirements.

### **1.5.1 National Environmental Policy Act**

NEPA is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. NEPA mandates a structured approach to environmental impact analysis that requires Federal agencies to use an interdisciplinary and systematic approach in their decision-making process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions.

The CEQ was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations specify the reasons to prepare an EA:

- Briefly provide evidence and analysis for determining whether to prepare an EIS or a FONSI/FONPA.
- Aid in an agency’s compliance with NEPA when an EIS is unnecessary.
- Facilitate preparation of an EIS when one is necessary.

Air Force Policy Directive (AFPD) 32-70, Environmental Quality, states that the USAF will comply with applicable Federal, State of Ohio, and local environmental laws and regulations, including NEPA. The USAF’s implementing regulation for NEPA is EIAP.

### 1.5.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decision making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decision-maker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated “with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively.”

Potentially relevant statutes and regulations to which the USAF must comply are summarized in **Table 1-1**. The regulatory requirements are presented under each appropriate category in Section 3.0 of the EA.

**Table 1-1. Summary of Applicable Regulatory Requirements**

Compliance Area	Regulatory Requirements
Air Quality	Clean Air Act as amended, 42 U.S. Code (USC) § 7401 et seq.
	Air Force Instruction (AFI) 7040 Air Quality Compliance and Resources Management
	National Ambient Air Quality Standards – 40 Code of Federal Regulations (CFR) 81.34 Metropolitan Dayton Intrastate Air Quality Control Region and 40 CFR 81.336 Ohio Attainment Standards
	Ohio Administration Code (OAC) 3745-17 Particulate Matter Standards
	OAC 3745-31 Permit to Install New Source of Pollution
	OAC 3745-25 Emergency Episode Standards
	OAC 3745-15-05 <i>de minimis</i> air contaminant source exemption
Cultural/Historic Resources	National Historic Preservation Act as amended, 16 U.S.C. § 470 et seq.
	36 CFR Part 800 – Protection of Historic and Cultural Properties
	AFI 32-7065, Cultural Resources Management
Health and Safety	Occupational Safety and Health Act as amended, Subpart Z Toxic and Hazardous Substances
	29 CFR Part 1910 Occupational Safety and Health Standards
	29 CFR Part 1926 Safety and Health Regulations for Construction
	National Fire Protection Association, National Fire Codes
Land Use	AFI 32-7063, Air Installation Compatible Use Zone Program Unified Facilities Criteria (UFC) 3-260-01, Airfield and Heliport Planning and Design
Biological Resources	Endangered Species Act (ESA), 16 U.S.C. §1531 et seq.
	50 CFR Part 402 Interagency Cooperation--ESA of 1973, as amended
	Ohio Revised Code 1531.25, Protection of Species Threatened with State-Wide Extinction
	National Environmental Policy Act as amended, 42 U.S.C. § 4321 et seq.
	AFI 32-7064, Integrated Natural Resource Management Plan
Noise	29 CFR 1910.95 Occupational Noise Exposure

Compliance Area	Regulatory Requirements
Wastewater & Storm water	Federal Water Pollution Control Act (Clean Water Act) as amended, 33 USC. § 1251 et seq.
	Air Force Regulation (AFR) 32-1021 Planning and Programming Military Construction Projects
	40 CFR Part 122.26 Storm Water Discharges
	OAC 3745-33 Ohio National Pollution Discharge Elimination System (NPDES) Individual Permits
	OAC 3745-38 NPDES General Permits
	OAC 3745-42 Permits to Install and Plan Approvals for Water Pollution Control
	City of Dayton Sewer Use Ordinance (April 23, 2008)

### 1.5.3 Interagency and Intergovernmental Coordination for Environmental Planning and Community Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decision making process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. CEQ regulations implementing NEPA specifically state, “There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping.”

The Intergovernmental Coordination Act and Executive Order (EO) 12372, Intergovernmental Review of Federal Programs, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. Air Force Instruction (AFI) 32-7060 requires the USAF to implement a process known as Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), which is used for the purpose of agency coordination and implements scoping requirements.

Through the IICEP process, the USAF notified relevant Federal, state, and local agencies of the action proposed and provided them the opportunity to make known their environmental concerns specific to the action. The IICEP process provides the USAF the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. Agency consultation letters were sent to the United States Fish and Wildlife Service (USFWS); Ohio State Historic Preservation Office (SHPO); and other Federal, state, and local agencies. Agency responses were provided to the USAF and incorporated into the analysis of potential environmental impacts performed as part of the EA. IICEP correspondence is included in **Appendix A**.

A Notice of Availability (NOA) for the EA and Draft FONSI/FONPA was published in the *Dayton Daily News* on April 16, 2013, initiating the public review period. The EA and Draft FONSI/FONPA were made available in the Fairborn Public Library from April 16, 2013, until May 15, 2013. During this time period, no public comments were received; however, the WPAFB Office of Public Affairs provided answers to the following questions posed by the *Dayton Daily News*: where to locate a copy of the EA, estimated cost of the project, how the project would be completed, when the project would be executed,

and when the last glide slope obstruction project was completed. The NOA and *Dayton Daily News* questions with answers provided by the Office of Public Affairs are included in **Appendix A**.

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## 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

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### 2.1 Introduction

This section provides an introduction to the Proposed Action, criteria used in selecting the Proposed Action, a detailed description of the Proposed Action, a description of an action alternative, a description of the No Action Alternative, identification of alternatives eliminated from further consideration, and a comparison of environmental consequences between the alternatives.

The 88 ABW/CE proposes to treat woody vegetation in order to provide adequate clearance for aircraft operations at WPAFB. The objective of the Proposed Action is to remove vegetation violating UFC 3-260-01 that is obstructing CZs, transitional areas, and glide slope areas for Runways 23R and 23L at WPAFB within 18 identified sites located in the Wright Memorial, Riverview, and Sandhill areas. Three alternatives were developed and analyzed for potential impacts in this EA:

- Alternative A: Proposed Action -Remove Vegetation to Ground Level in all CZs, transitional areas, and glide slopes except Treatment Sites A (Wright Memorial), G (Sandhill), and J (Sandhill) and prune vegetation to 10 ft below the ADCS zone of the glide slope for Treatment Sites A, G, and J (cutting height would vary with the distance of the treatment area from the runways);
- Alternative B: Remove woody vegetation to ground level in the CZs at Treatment Sites 1A, 2, 3, 5, 6, and 7 and prune vegetation in the glide slopes and transitional areas (Sites A, B, C, D, E, F, G, H, I, J, K, and 4) to 10 ft below the ADCS zone of the glide slope and transitional area (cutting height would vary with the distance of the treatment area from the runways); and
- Alternative C: No Action (No Treatment).

The alternatives analyzed in this document in accordance with NEPA are the result of agency and scoping input. The process for developing alternatives is described below in Section 2.2. A summary of the alternatives and how they apply to each of the 18 treatment sites is provided in **Table 2-1**. All alternatives considered must meet the purpose and need for the Proposed Action. Conceptual alternatives that were considered but eliminated from further analysis are discussed in Section 2.5.

**Table 2-2** at the end of this section summarizes the impacts of the alternatives for this project.

### 2.2 Process for Alternatives Development

Alternatives were selected by consensus of an interdisciplinary project team consisting of representatives of 88 ABW/CE and Airfield Operations personnel. The alternatives represent a reasonable range of obstruction clearing methods. Objectives considered during formulation of alternatives were:

- Cost-effectiveness
- Safety of removal technique

- Permanency of effect of treatment
- Minimization of conditions that increase bird aircraft strike hazard
- Minimization of ground disturbance
- Efficiency of woody debris disposition

Alternative A (Proposed Action) and Alternative B address vegetative obstructions within the glide slope areas, transitional areas, and CZs. The boundaries of the 18 treatment sites were determined based on field data collected using Global Positioning System (GPS) technology that indicated violations of vegetation obstructions within the 50:1 glide slope, the 7:1 transitional area, and the clear zone. Areas not identified as treatment sites contained no vegetation obstructions that violated the glide slope, transitional area, or CZ requirements.

The Proposed Action and Alternative B combine multiple treatment techniques and these techniques were formulated based on cost effectiveness, permanency of treatment, and minimization of bird aircraft strike hazards. Habitat improvement was not a focus of alternatives development. A summary of the alternatives and how they apply to each of 18 treatment sites is provided in **Table 2-1**. Aerial photographs of each treatment site are depicted in **Figure 2-1** and photographs of the general treatment areas are presented in **Appendix B**.

The Proposed Action, Alternative B, and the No Action Alternative, are described below.

### **2.3 Alternative A, Proposed Action**

The 88 ABW/CE is proposing to remove woody vegetation to ground level in all CZs, transitional areas, and glide slopes except at Treatment Sites A (Wright Memorial), G (Sandhill), and J (Sandhill). Removal of plant species within CZs, transitional areas, and glide slopes (except Treatment Sites A, G, and J) would be eliminated using appropriate eradication techniques (e.g., cutting of woody plants to ground level followed by chemical application to exposed woody tissue – the type(s) of any proposed chemical applications would be coordinated with the Natural Resources Program Manager (NRPM) prior to project initiation). These eradication techniques involve mechanized cutting with the use of appropriate tree removal equipment (e.g., shearer, knuckle boom loader with disk saw, chainsaw). Cut woody material within all treatment sites (except A, G, and J) would be chipped and distributed over treated areas to a depth of 2 inches followed by application of topsoil and seeded with a perennial grass mix to control erosion. Excess wood chips would be properly disposed of off-Base. Stumps remaining in all treatment sites would not be removed.

Pruning treatments in Sites A, G, and J would involve only a chainsaw or other appropriate pruning equipment. No heavy equipment would be allowed to traverse potential habitat areas in Treatment Sites G and J. Vegetation in the glide slope at Treatment Site A would be carefully pruned to maintain a park-like memorial setting using “drop crotch” (cutting resulting in a more natural appearance, increasing the time before pruning is needed again) pruning methods on less than 20 trees surrounding the Wright

**Table 2-1. Summary of Alternatives**

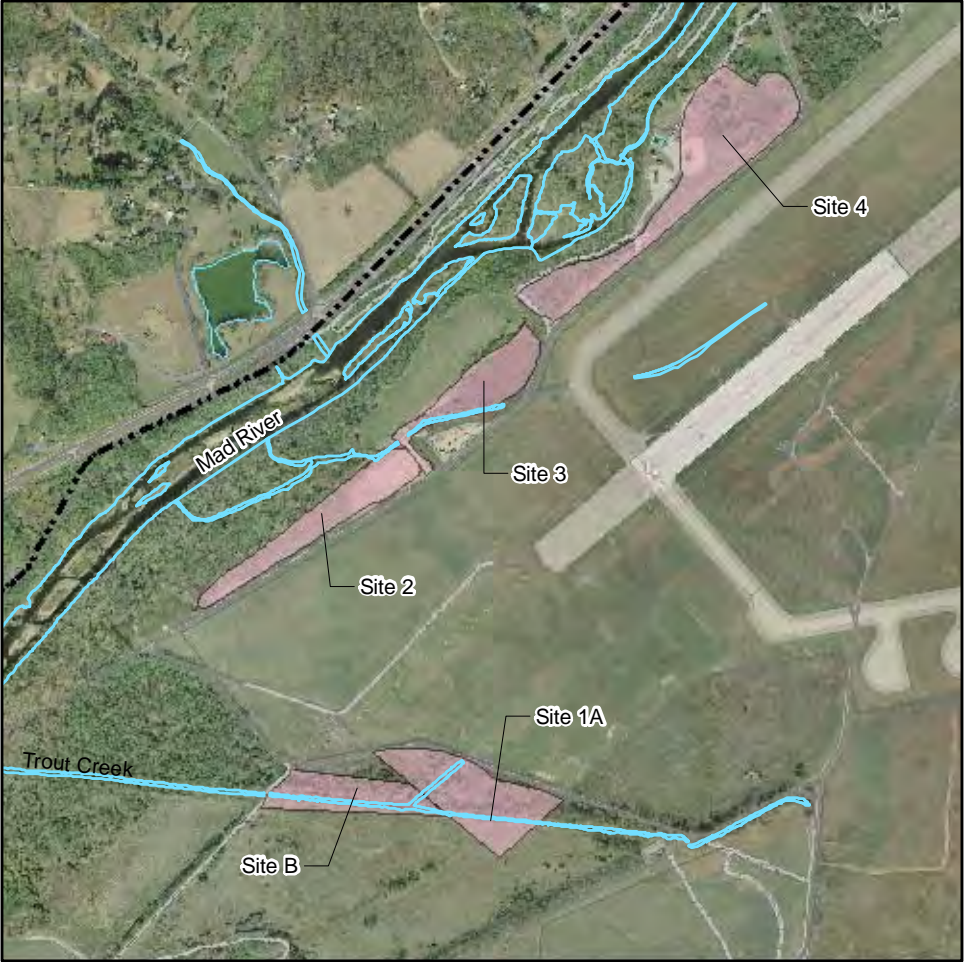
Treatment Sites	Acres	Alternative A Proposed Action	Alternative B Woody Vegetation Removal, Trimming, and Pruning	Alternative C No Action
Site A – Glide Slope	0.50	Prune only; maximum height 50 ft	Same as Proposed Action	No Treatment
Site B – Glide Slope	5.50	Remove vegetation to ground level, seeding	Cut 10 ft below glide slope; maximum height 50 ft, seeding	
Site C – Glide Slope	1.08		Cut 10 ft below glide slope; maximum height 24 ft, seeding	
Site D – Glide Slope	1.71		Cut 10 ft below glide slope; maximum height 18 ft, seeding	
Site E – Glide Slope	2.23		Remove to ground level; 6 ft maximum height, seeding	
Site F – Glide Slope	1.22		Remove to ground level; 8 ft maximum height, seeding	
Site G – Glide Slope	9.01		Prune only; maximum height 50 ft	
Site H – Glide Slope	0.52	Remove vegetation to ground level, seeding	Cut 10 ft below glide slope; maximum height 23 ft, seeding	
Site I – Glide Slope	0.18		Remove to ground level; 2 ft maximum height, seeding	
Site J – Glide Slope	2.20	Prune only; maximum height 50 ft	Cut 10 ft below glide slope; maximum height 35 ft, seeding	
Site K – Glide Slope	3.01	Remove vegetation to ground level, seeding		
Site 1A - Clear Zone	13.7			
Site 2 - Clear Zone	6.90		Remove to ground level, seeding	
Site 3 - Clear Zone	6.30			
Site 4 - Transitional Area	15.80		Cut 10 ft below glide slope; maximum height 47 ft, seeding	
Site 5 - Clear Zone	1.80		Remove to ground level, seeding	
Site 6 - Clear Zone	9.28			
Site 7 - Clear Zone	4.72			
Total Acreage	90	(approximate)		

### Wright Memorial Area (Site A)



1 inch = 200 feet

### Riverview Area



1 inch = 1,500 feet

### Sandhill Area



1 inch = 1,500 feet

#### Legend

- WPAFB Base Boundary
- Sites A, G, & J = Prune Only; Maximum Height 50 feet
- Sites B, C, D, E, F, H, I, K, 1A, 2, 3, 4, 5, 6, & 7 = Remove to Ground Level



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**Figure 2-1**  
**Aerial Photograph of Each Treatment Site**

Memorial. Cuttings from Treatment Site A would be transported off-Base to an approved area for disposal. Cuttings from Treatment Sites G and J would be transported to other treatment sites for chipping.

For areas requiring application of topsoil and seeding, a long-term seeding/restoration plan would be developed prior to project initiation. This plan would be developed with the assistance of the NRPM and would include measures such as planting low-growing shrubs in treatment areas in order to prevent re-forestation. This plan would ensure that this type of project would not need to be re-initiated every ten years or whenever removal of obstructions becomes necessary.

## **2.4 Alternative B, Woody Vegetation Removal, Variable Height Cutting, and Pruning**

Alternative B includes removal of woody vegetation to ground level in the CZs at Sites 1A, 2, 3, 5, 6, and 7. Vegetation in the glide slope and transitional areas (Sites A, B, C, D, E, F, G, H, I, J, K, and 4), would be pruned to 10 ft below the ADCS of the glide slope and transitional slope. The cutting height would vary with the distance of the treatment area from the runways. Treatment techniques for the removal and pruning methods are as described for the Proposed Action.

The distinction between the Proposed Action and Alternative B is that under the Proposed Action, vegetation at all treatment sites (except A, G, and J) would be removed to ground level. Alternative B consists of a variation of treatment techniques whereby only the removal of vegetation to ground level would occur in the clear zone, or at 7 of the 18 treatment sites (**Table 2-1**).

## **2.5 Alternative C, No Action**

Under the No-Action Alternative, no removal or pruning of vegetative obstructions in the CZs, transitional areas, or glide slopes would occur. No vegetative treatments would occur and vegetation obstructing the glide slope, transitional area, and clear zone would remain in place.

Although this alternative does not satisfy the purpose and need of protecting human health and safety, it is included in the environmental analysis to provide a baseline for comparison with the Proposed Action and is analyzed in accordance with CEQ regulations for implementing NEPA. Although this alternative would eliminate unavoidable adverse, short-term impacts associated with the Proposed Action, the No Action Alternative would not satisfy selection criteria established under the purpose and need for this project, resulting in:

- Safety concerns in the ADCS, transitional area, glide slope, and clear zone
- Failure to meet 88 ABW's mission

The No-Action Alternative does not meet 88 ABW's purpose of protecting human health and safety by providing adequate clearance for aircraft operations. The vegetative overstory would continue to encroach the ADCS area and aircraft approaching and departing WPAFB would continue to be obstructed by vegetative overstory. The No-Action Alternative would not fulfill safety requirements.

## **2.6 Alternatives Eliminated from Further Study**

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. For alternatives to be considered reasonable and warrant further detailed analysis they must be affordable, implementable, and meet the purpose and need for the action based on the project requirements stated in Section 2.2. Conceptual alternatives to the Proposed Action were considered to determine their feasibility as a viable alternative to removing and pruning trees in the glide slope and clear zone at WPAFB.

A potential alternative that included an obstruction clearing method using a bulldozer was considered early in the process. This alternative was eliminated from further analysis as it does not meet the objective of minimizing ground disturbance as listed in Section 2.2. The felling of vegetation with a bulldozer uproots trees and may cause soil instability, potentially leading to an increase of sediment loading into waterways.

Stump removal was also eliminated because ground disturbance would potentially increase sediment loading in waterways. In addition, some of the treatment sites occur at Environmental Restoration Program (ERP) sites where there are restrictions on digging or excavating in these areas. Due to concerns regarding surface water and ERP sites, this treatment technique was eliminated and was not evaluated in detail.

## **2.7 Comparison of Environmental Consequences**

The impacts associated with the Proposed Action and the No Action Alternative is summarized in **Table 2-2**. The information includes a concise definition of the issues addressed and the environmental impacts associated with each alternative. The analysis is based on information discussed in detail in Section 4.0, Environmental Impacts, of the EA.

**Table 2-2. Comparison of Environmental Consequences**

Affected Environment	Alternative A: Proposed Action	Alternative B: Woody Vegetation Removal, Variable Height Cutting/Pruning	Alternative C: No Action
Land Use	<p>Short-Term: No adverse impact because no changes to land use would occur at or surrounding WPAFB.</p> <p>Long-Term: No adverse impact because no changes to land use would occur at or surrounding WPAFB.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Air Quality	<p>Short-Term: Minor, short-term adverse impact from particulate matter and engine exhaust emissions generated during tree cutting/pruning activities. Impacts would be minor because emissions would be short in duration and are negligible with respect to overall emissions expected in the region.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Noise	<p>Short-Term: Potential adverse impacts to project workers would be minimized by adherence to health and safety regulations. Minor, negative impacts on ambient noise from tree cutting/pruning activities to nearby workers and residents. Impacts would be minor because equipment use would be intermittent and removal activities would be of short duration.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>

Affected Environment	Alternative A: Proposed Action	Alternative B: Woody Vegetation Removal, Variable Height Cutting/Pruning	Alternative C: No Action
Geology and Soils	<p>Short-Term: Potential minor impacts during cutting/pruning activities (i.e., soil erosion) to most areas. Impacts would be minor because erosion controls would be implemented.</p> <p>Long-Term: No adverse impact to soils, topography, or physiographic features.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
<p>Water Resources</p> <p>Groundwater</p> <p>Surface Water</p> <p>Floodplains</p>	<p>Short-Term: No adverse impact.</p> <p>Long-Term: No adverse impact.</p> <p>Short-Term: Adverse impact from surface water runoff during cutting/pruning activities. Impacts will be minor because erosion controls would be implemented.</p> <p>Long-Term: No adverse impact.</p> <p>Short-Term: No adverse impacts because there would be no net loss or gain of soils in the floodplain.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p> <p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: No adverse impact.</p> <p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p> <p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p> <p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>

Affected Environment	Alternative A: Proposed Action	Alternative B: Woody Vegetation Removal, Variable Height Cutting/Pruning	Alternative C: No Action
<p>Biological Resources</p> <p>Vegetation</p> <p>Wildlife</p>	<p>Short-Term: Impacts to vegetation include the loss of approximately 50 acres of trees in the CZs and selected glide slope areas and partial tree removal within approximately 39 acres of the transitional area. Impacts are expected to be minor because the flora and vegetation within the proposed project areas are common to the Base and the region.</p> <p>Long-Term: Impacts are expected due to partial tree removal within approximately 39 acres of the transitional area and permanent loss of approximately 50 acres of trees at sites in the CZs and selected glide slope areas. Impacts include potential increase in mortality of trees that have been cut to meet height restrictions. However, the flora and vegetation within the proposed project areas are common to the Base and the region.</p> <p>Short-Term: Adverse impacts are expected due to disturbance of wildlife during project activities and loss of foraging and nesting habitat from cutting/pruning trees. Impacts are expected to be minor due to the transient nature of the terrestrial species known to occur in the proposed project area and the frequent occurrences of these species throughout the region.</p> <p>Long-Term: Impacts due to loss of foraging and nesting habitat are expected to be minor because the terrestrial species known to occur in the proposed project area are common throughout the region.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p> <p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p> <p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>

<b>Affected Environment</b>	<b>Alternative A: Proposed Action</b>	<b>Alternative B: Woody Vegetation Removal, Variable Height Cutting/Pruning</b>	<b>Alternative C: No Action</b>
Threatened and Endangered Species	<p>Short-Term: Minor adverse impact on Indiana bat habitat. Impacts would be minimized because there are less than one dozen trees within the proposed project area with exfoliating bark or cavities and trees would be removed outside of maternity season.</p> <p>Long-Term: Loss of approximately 30 acres of Indiana bat habitat within 0.6 miles if the mist capture sites. Impacts would be minor because 95 percent of forest cover within the 0.6 mile area would remain. Approximately 60 acres of suitable Indiana bat habitat outside of the 0.6 mile area would be removed.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Wetlands	<p>Short-Term: No adverse impacts to wetlands are expected due to the implementation of avoidance measures.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Cultural Resources	<p>Short-Term: No adverse impacts. Archaeological sites would be identified in the field prior to project activities and vehicle traffic would be minimized.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Socioeconomics	<p>Short-Term: Minor beneficial impact on local economy from revenue generated by trimming/pruning activities.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Environmental Justice	<p>Short-Term: No adverse impact.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>

Affected Environment	Alternative A: Proposed Action	Alternative B: Woody Vegetation Removal, Variable Height Cutting/Pruning	Alternative C: No Action
Infrastructure	<p>Short-Term: Intermittent adverse impacts from project traffic. Impacts would be negligible because the treatment areas are not in high-traffic areas and tree removal operations are of short duration.</p> <p>Long-Term: No adverse impact.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Health and Safety	<p>Short-Term: Potential adverse impacts to project workers would be minimized by adherence to health and safety regulations.</p> <p>Long-Term: Beneficial impact on flight safety due to cutting/pruning trees above height restrictions.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Short-Term: Potential for aircraft accidents due to trees exceeding height restrictions. The probability and severity of aircraft accidents are not known.</p> <p>Long-Term: Increased potential for aircraft accidents as tree height increases. The probability and severity of aircraft accidents are not known.</p>
<p>Hazardous Materials/Waste/ ERP Sites</p> <p>Hazardous Materials</p> <p>Hazardous Waste</p>	<p>Short-Term: Negligible adverse impact. Hazardous materials used during trimming/pruning activities would not be expected to increase.</p> <p>Long-Term: Negligible adverse impact. Hazardous materials used would not be expected to increase.</p> <p>Short-Term: Negligible adverse impact. Hazardous wastes generated during construction would not be expected to increase and would be handled, stored, transported, disposed of, or recycled in accordance with WPAFB's Hazardous Waste Management Plan.</p> <p>No adverse impact to ERP sites because ground disturbance would be minimal.</p>	<p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p> <p>Short-Term: Similar to Proposed Action.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p> <p>Short-Term: No impact.</p>

Affected Environment	Alternative A: Proposed Action	Alternative B: Woody Vegetation Removal, Variable Height Cutting/Pruning	Alternative C: No Action
<p>Hazardous Materials/Waste/ERP Sites (continued)</p> <p>Hazardous Waste (continued)</p> <p>ERP Sites</p>	<p>Long-Term: Negligible adverse impact. It is anticipated that the volume, type, classifications, and sources of hazardous wastes would be similar in nature with the baseline condition waste streams.</p> <p>Short-Term: Negligible adverse impact. LUCs would not be compromised by cutting or pruning activities and stumps would not be removed from any treatment site; therefore, no violations to the terms of the ROD would result.</p> <p>Long-Term: Same as short-term.</p>	<p>Long-Term: Similar to Proposed Action.</p> <p>Short-Term: Similar to Proposed Action.</p> <p>Long-Term: Similar to Proposed Action.</p>	<p>Long-Term: No impact.</p> <p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>

### **3.0 AFFECTED ENVIRONMENT**

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This section describes the current environmental and socioeconomic conditions most likely to be affected by the Proposed Action. It provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action.

In compliance with NEPA, CEQ guidelines, and 32 CFR 989, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. These resources and conditions include land use, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, health and safety, and hazardous materials and wastes. Analysis of potential environmental effects focuses on those resource areas that are appropriate for consideration in light of a proposed action. All resource areas are initially considered, but some may be eliminated from detailed examination because they do not directly apply to a particular proposal.

#### **3.1 Land Use**

##### **3.1.1 Definition of the Resource**

The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure both orderly growth and compatible uses among adjacent property parcels or areas. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project sites and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its “permanence.”

To address land use with respect to noise and safety associated with aircraft operations, Department of Defense (DoD) required military departments to establish an Air Installation Compatible Use Zone (AICUZ) program. The goal of AICUZ is to promote compatible land use around air bases by providing information concerning aircraft operations, noise exposure, and accident potential to local governments (WPAFB 1995a, 2001).

One component of the AICUZ study was the development of noise contours. These contours are produced by the computerized Day-Night Average A-Weighted Sound Level (DNL) metric and the NOISEMAP methodology. In the context of aircraft operations, land use compatibility is also described in the context of noise levels. The AICUZ study included both the conditions that existed at the time the study was prepared as well as a Maximum Mission Scenario that was based on the noise effects of various potentially feasible mission changes.

The Maximum Mission (also known as Mission Capacity) Scenario was established for WPAFB to provide consistency when zoning and land use policies in the community are established. Because the noise contours were based on conservative assumptions regarding future missions, local zoning does not need to be adjusted with changes in missions. Therefore, the noise contours for the Maximum Mission Scenario remain in effect for local community planning purposes. Noise contour analysis is addressed in Section 3.3 of this EA.

The AICUZ program is also intended to reduce the potential for aircraft mishaps in populated areas. As a result of this program, WPAFB has altered basic flight patterns to avoid heavily populated areas. In addition, airfield safety zones were established under AICUZ to minimize the number of people who would be injured or killed if an aircraft crashed. Three safety zones are designated at the end of all active runways: CZ, Accident Potential Zone (APZ) I, and APZ II.

The AICUZ CZ represents the most hazardous area. APZs are outside of the CZs. APZ I am located immediately beyond the CZ and have a high potential for accidents. APZ II is immediately beyond APZ I and has measurable potential for accidents. While aircraft accident potential in APZs I and II does not necessarily warrant acquisition by USAF, land use planning and controls are strongly encouraged for the protection of the public. Compatible land uses are specified for these zones. According to AFI 32-7063, all new construction is required to comply with the AICUZ.

### **3.1.2 Existing Conditions**

#### **On-Base Land Use**

WPAFB comprises 8,145 acres near Dayton, Ohio, and is divided into two areas: A and B. Area A contains administrative activities, airfield operation, maintenance, and civil engineering activities; and Area B focuses on acquisition, education, research, and development. The Base is expected to fulfill numerous roles within the USAF, incorporating both natural and man-made development constraints

within the Base boundaries. Over 2,500 acres of WPAFB remain undeveloped due to various development constraints.

There is a wide variety of land use classifications on WPAFB. Open Space and Outdoor Recreation represent some of the land constrained from development. Over 2,000 acres of this undeveloped land lies within the natural constraints area, which is composed of areas such as floodplains, lakes, wetlands, or areas with unsuitable soil for building. Also located within the natural constraint area is the 109-acre Huffman Prairie Flying Field containing remnant prairie habitat, which includes several rare plant and animal species.

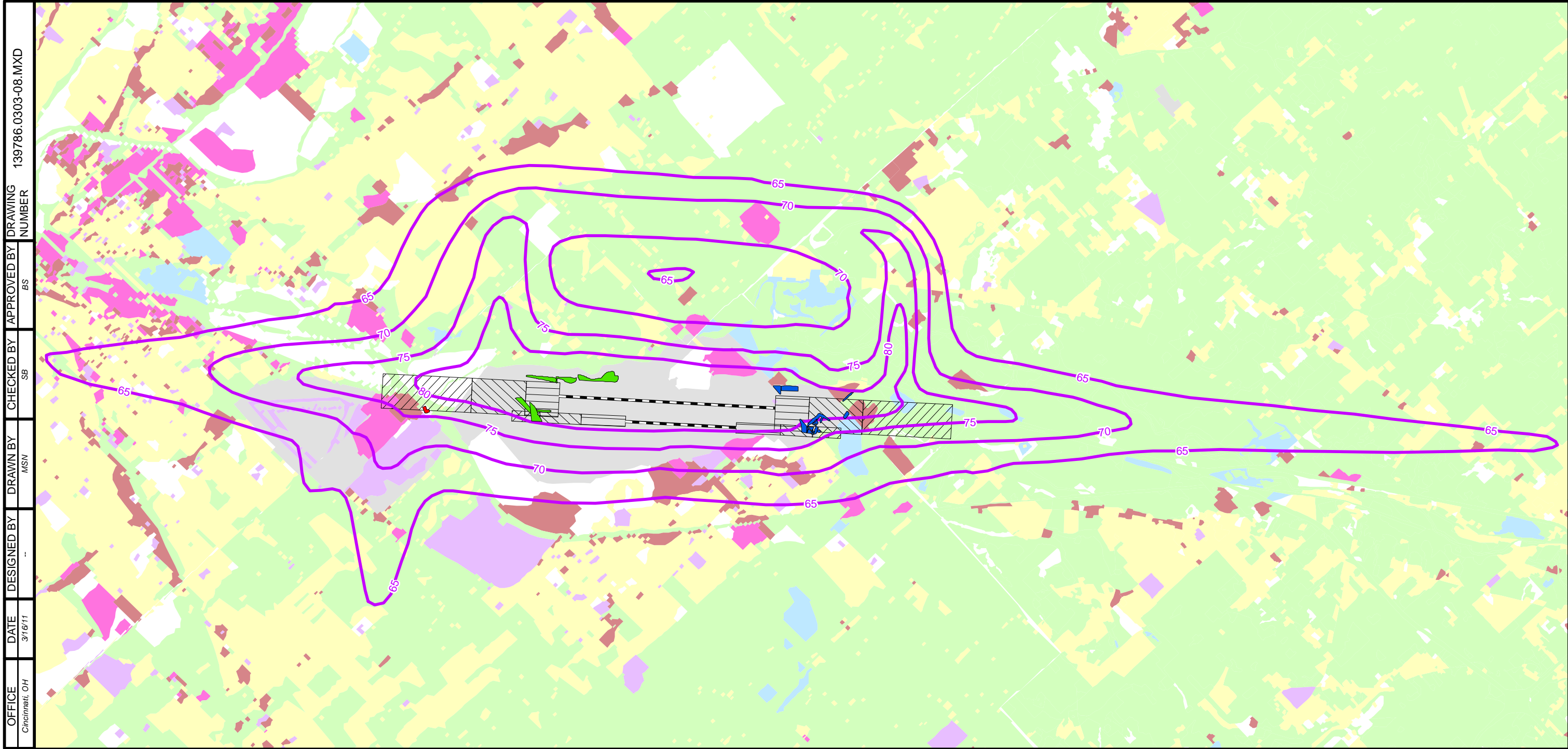
Human-made constraints also restrict development within the WPAFB boundaries. Included in these types of constraints are archaeological sites and historic buildings, which can be identified sites or those that remain undiscovered. Operational restrictions can also impede development. Noise contours from aircraft operations and explosive safety zones must be considered when looking at developing areas on the Base. Airfield and airspace control surfaces, such as runway approach CZs, are to remain clear of building obstructions. The presence of past waste disposal sites and fire training areas must be considered when siting facilities (WPAFB 1995a).

### **Surrounding Land Use**

Land uses around WPAFB vary from heavily urbanized to rural agricultural (**Figure 3-1**). Most of the urbanized areas are west of the Base, with the low-density or agricultural area located east of the Base.

To the west and south of WPAFB is the Dayton metropolitan area. This area is comprised of higher population density cities such as Dayton, Huber Heights, Riverside, Fairborn, and Beavercreek. These cities, along with WPAFB, are within Greene and Montgomery counties. The 2010 census data had not been finalized when this EA was prepared; therefore, the most recent census data from 2000 were used. According to the most recent census data, Greene County has a population of 147,886 persons while Montgomery County has 559,062 persons (Bureau of Census 2000a). To the east and north of WPAFB is largely open area with agricultural lands interspersed with low-density development located within Miami and Clark counties. According to the most recent census data, Miami County has a population of 98,868 persons while Clark County has 144,741 persons (Bureau of Census 2000a).

Most of the land surrounding WPAFB that is impacted from Base activities is compatible with Base operations. Many factors contribute to the compatibility of land uses that are within Base activity areas. Development patterns and services available encourage or restrict development in many areas outside incorporated cities, and many areas immediately surrounding the Base are development-restricted due to floodplains or well water protection restrictions. Progressive land use controls have been the most important factor concerning compatible development within noise and APZs at WPAFB (WPAFB 1995a).



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	3/16/11	--	MSW	SB	BS	139786.0303-08.MXD

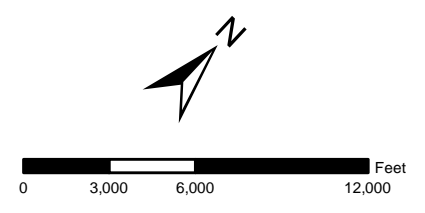
**Legend:**

- Clear Zones
- APZ I
- APZ II
- Sandhill
- Wright Memorial
- Riverview
- Maximum Mission DNL Noise Contours
- Residential
- Commercial
- Industrial
- Institutional
- Open Space
- Vacant and Agricultural
- Rock / Mineral Extraction (i.e., gravel pit)
- Airports

**Note:**  
DNL Noise Levels in Decibels  
65, 70, 75, 80, 85

Source: 1995 AICUZ Study Maximum Mission

Source: Land Use - Ohio Department of Natural Resources  
Montgomery County Land Use data; Miami County Land Use Data;  
Clark County Land Use data; Greene County Land Use data.



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**Figure 3-1**  
**Existing Land Use and**  
**Maximum Mission Noise Contours**

### ***Wright Memorial Area***

Wright Memorial is located in an area classified as Outdoor Recreation. Land use on WPAFB property in the immediate vicinity of Wright Memorial is classified as Commercial, Industrial, and Open Space. The Wright Memorial Treatment Site is located on the southern boundary of the southern-most AICUZ CZ (Figure 3-1).

### ***Riverview Area***

The area southwest of the runways is currently classified as Industrial, Open Space, and Outdoor Recreation. Portions of Treatment Sites 1A and B are located in the Licensed Hunting Preserve. Land use to the northeast of the Riverview Area is classified as Outdoor Recreation, Airfield, and Aircraft Runways and Taxiways. Riverview Treatment Sites 1A and B are located within APZ I and APZ II (Figure 3-1).

### ***Sandhill Area***

The Sandhill Area is located in an area currently classified as Open Space. Hunting is permitted in the Sandhill Area between September 1 and January 31. Various species hunted include deer, squirrel, rabbit, fox, raccoon, dove, and woodchuck. Land use on WPAFB property to the southwest of the Sandhill Area is classified as Airfield and Aircraft Taxiways. Immediately adjacent to the Sandhill Area but outside the WPAFB boundary, land is zoned for residential development. A residential area is located east of the Sandhill Area. All Treatment Sites in the Sandhill Area (except Sites 5 and 6) are located within APZ I and APZ II (Figure 3-1).

## **3.2 Air Quality**

### **3.2.1 Definition of the Resource**

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these “criteria pollutants” in ambient air are expressed in units such as parts per million (ppm) or micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the “air basin,” and the prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone ( $\text{O}_3$ ), carbon monoxide (CO), nitrogen dioxide ( $\text{NO}_2$ ), sulfur dioxide ( $\text{SO}_2$ ), respirable particulate matter (including particulates equal to or less than

10 microns in diameter [ $PM_{10}$ ] and particulates equal to or less than 2.5 microns in diameter [ $PM_{2.5}$ ]), and lead (Pb).

The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-1** presents the primary and secondary NAAQS.

**Table 3-1. National Ambient Air Quality Standards**

Pollutant	Standard Value <sup>6</sup>		Standard Type
CARBON MONOXIDE (CO)			
8-hour average	9 ppm	(10 mg/m³)	Primary
1-hour average	35 ppm	(40 mg/m³)	Primary
NITROGEN DIOXIDE (NO <sub>2</sub> )			
Annual arithmetic mean	0.053 ppm	(100 µg/m³)	Primary and Secondary
1-hour average <sup>1</sup>	0.100 ppm	(188 µg/m³)	Primary and Secondary
OZONE (O <sub>3</sub> )			
1-hour average <sup>2</sup>	0.12 ppm	(235 µg/m³)	Primary and Secondary
8-hour average <sup>2</sup>	0.075 ppm	(147 µg/m³)	Primary and Secondary
LEAD (Pb)			
3-month average <sup>3</sup>		0.15 µg/m³	Primary and Secondary
PARTICULATE < 10 MICROMETERS (PM <sub>10</sub> )			
24-hour average <sup>4</sup>		150 µg/m³	Primary and Secondary
PARTICULATE < 2.5 MICROMETERS (PM <sub>2.5</sub> )			
Annual arithmetic mean <sup>4</sup>		15 µg/m³	Primary and Secondary
24-hour average <sup>4</sup>		35 µg/m³	Primary and Secondary
SULFUR DIOXIDE (SO <sub>2</sub> )			
1-hour average <sup>5</sup>	0.075 ppm	(196 µg/m³)	Primary
Annual arithmetic mean <sup>5</sup>	0.03 ppm	(80 µg/m³)	Primary
24-hour average <sup>5</sup>	0.14 ppm	(365 µg/m³)	Primary

Notes:

- 1 In February 2010, USEPA established a new 1-hr standard at a level of 0.100 ppm, based on the 3-year average of the 98<sup>th</sup> percentile of the yearly distribution concentration, to supplement the existing annual standard.
- 2 In March 2008, the USEPA revised the level of the 8-hour standard to 0.075 ppm. With regards to the secondary standard for O<sub>3</sub>, USEPA revised the current 8-hour standard by making it identical to the revised primary standard.
- 3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m<sup>3</sup>. USEPA revised the averaging time to a rolling 3-month average.
- 4 In October 2006, USEPA revised the level of the 24-hour PM<sub>2.5</sub> standards to 35 µg/m<sup>3</sup> and retaining the level of the annual PM<sub>2.5</sub> standard at 15 µg/m<sup>3</sup> and retaining the level of the annual PM<sub>2.5</sub>. With regard to primary standards for particle generally less than or equal to 10 µm in diameter (PM<sub>10</sub>), USEPA is retaining the 24-hour standard and revoking the annual PM<sub>10</sub> standard.
- 5 In June 2010, USEPA established a new 1-hr SO<sub>2</sub> standard at a level of 75 parts per billion (ppb), based on the 3-year average of the annual 99<sup>th</sup> percentile of 1-hour daily maximum concentrations. The USEPA is also revoking both the existing 24-hour and annual primary SO<sub>2</sub> standards.
- 6 Parenthetical value is an approximately equivalent concentration for NO<sub>2</sub>, O<sub>3</sub> and SO<sub>2</sub>.

ppb: parts per billion

ppm: parts per million

mg/m<sup>3</sup>: milligrams per cubic meter

µg/m<sup>3</sup>: micrograms per cubic meter

The criteria pollutant O<sub>3</sub> is not usually emitted directly into the air, but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or “O<sub>3</sub> precursors.” These O<sub>3</sub> precursors consist primarily of nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O<sub>3</sub> concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO<sub>x</sub>.

The USEPA has recognized that particulate matter emissions can have different health affects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter PM<sub>10</sub> and fine particulate matter PM<sub>2.5</sub>. The pollutant PM<sub>2.5</sub> can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable PM<sub>2.5</sub> can include SO<sub>2</sub>, NO<sub>x</sub>, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there and thus which precursors are considered significant for PM<sub>2.5</sub> formation and identified for ultimate control.

The USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by the USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by the USEPA.

The CAA required that the USEPA draft general conformity regulations. These regulations are designed to ensure that Federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule and the promulgated regulations found in 40 CFR 93 exempt certain Federal actions from conformity determinations (e.g., contaminated site cleanup and natural disaster response activities). Other Federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a region. Once the net change in nonattainment pollutants is calculated, the Federal agency must compare them to the *de minimis* thresholds.

In 1997, the USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour O<sub>3</sub>, PM<sub>2.5</sub>, and regional haze standards that were promulgated in that year. Because of the litigation and resulting delay in implementing the new O<sub>3</sub> and PM<sub>2.5</sub> ambient air quality standards, however, these new conformity requirements were not completed by the USEPA until 2006 when the

PM<sub>2.5</sub> *de minimis* levels were added. The last revision of the General Conformity rules occurred in April 2010. The USEPA rule in this latest revision sought to clear up identified issues, reduce specific regulatory burdens, and modify the rules to be helpful to states revising their SIP for implementing the revised NAAQS while assuring Federal agency actions continue to conform. Several of the burden reduction measure changes made to the General Conformity applicability in 40 CFR 93.153 includes:

- Deleting the provision that requires Federal agencies to conduct a conformity determination for regionally significant actions where the direct and indirect emission of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emission inventory even though the total direct and indirect emissions are below *de minimis* levels.
- Adding new types of actions that Federal Agencies can include in their "presumed to conform" lists and permitting States to establish in their General Conformity SIPs "presumed to conform" lists for actions within their State.
- Finalizing an exemption for the emissions from stationary sources permitted under the minor source New Source Review (NSR) programs similar to the USEPA's existing General Conformity regulation which already provides for exemptions for emissions from major NSR sources.
- Establishing procedures to follow in extending the 6-month conformity exemption for actions taken in response to an emergency.

Title V of the CAA Amendments of 1990 requires states and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (e.g., plant, base, or activity) that has the potential to emit more than 100 tons annually of any one criteria air pollutant, 10 tons per year (tpy) of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants. However, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. For example, the Title V permitting threshold for an "extreme" O<sub>3</sub> nonattainment area is 10 tpy of potential VOC or NO<sub>x</sub> emissions. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if a proposed project's net emission increase meets or exceeds the rate of emissions listed in 40 CFR 52.21(b)(23)(i); or (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 µg/m<sup>3</sup> or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)].

### **3.2.2 Existing Conditions**

#### **Regional Climate**

The climate of this region of Ohio is humid and temperate with warm summers and cold winters. Average minimum and maximum temperatures are between 21 and 36 degrees Fahrenheit (°F) in January and 45 and 85 °F in July. The average annual precipitation is 38.43 inches, with June typically being the wettest month and October the driest month. The prevailing winds are from the southwest, with average monthly wind speeds between 3 and 7 knots.

#### **Regional Air Quality**

Under the authority of the CAA and subsequent regulations, the USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the NAAQS. Through the CAA, Congress has stated that the prevention and control of air pollution belongs at the state and local level, thus the USEPA has delegated enforcement of the PSD and Title V programs to the Ohio Environmental Protection Agency (OEPA). The OEPA has adopted the NAAQS by reference, thereby requiring the use of the standards within the State of Ohio.

#### **Wright-Patterson AFB**

WPAFB is located in Greene and Montgomery counties, which are located in the Metropolitan Dayton Intrastate AQCR (40 CFR 81.34). Each AQCR is classified as an attainment area or nonattainment area for each of the criteria pollutants depending on whether it meets or fails to meet the NAAQS for the pollutant. Ambient air quality for the Metropolitan Dayton Intrastate AQCR, which was formerly classified as a maintenance area for the 1-hour and 8-hour O<sub>3</sub>, is not yet designated for the new 8-hour O<sub>3</sub> NAAQS established in 2008.

Ambient air quality, which was classified as attainment for the NO<sub>2</sub> annual standard, is not yet designated for the new 1-hour standard established in 2010. Ambient air quality for SO<sub>2</sub> is not yet designated for the new 1-hour standard established in 2010. Ambient air quality for Pb, which was in attainment for the previous quarterly standard, is not yet designated for the new rolling 3-month standard established in 2008. The ambient air quality for PM<sub>2.5</sub> is classified as attainment for the 24-hour standard and nonattainment for the annual standard. The region is designated as an unclassifiable/attainment area for all other criteria pollutants. Unclassifiable areas are those areas that have not had ambient air monitoring and are assumed to be in attainment with NAAQS. Any of the pending attainment designations have no regulatory effect on the current analysis.

Air quality is typically good in the vicinity of WPAFB, and is generally affected only locally by military and civilian vehicle emissions, particulate pollution from vehicle traffic, emissions from wastewater treatment plants, industrial sources, and construction activities. Mobile sources, such as vehicle and aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements. Stationary emissions sources at WPAFB include natural gas and coal-fired

boilers; research and development sources, such as laboratory fume hoods and test cells; paint spray booths; refueling operations; and emergency power generators.

WPAFB is under the jurisdiction of USEPA Region 5 and the OEPA. The Regional Air Pollution Control Agency (RAPCA), under the jurisdiction of the OEPA, conducts annual compliance inspections at WPAFB. The base has long had an aggressive program of internal audits and inspections to ensure continual compliance with all applicable air permit terms and conditions. Detailed records are maintained to demonstrate compliance with emission limits, and reports are submitted in a timely manner to the local regulatory agency.

The WPAFB air emissions inventory includes over 1,400 emissions sources. Of these, approximately 1,050 are included in the Base's Title V permit application, which was originally submitted to the OEPA in February 1996 in accordance with CAA requirements. Many of the Title V sources are insignificant, including emergency generators and laboratory fume hoods. There were 29 permitted non-insignificant emissions units identified in the original application, most of which were boilers and paint spray booths. The OEPA finalized the Title V Operating Permit for WPAFB in January 2004 with an effective date of February 17, 2004 (OEPA 2004). A Title V renewal permit application was submitted to the OEPA in May 2008 and is currently under review. The Title V renewal application notified OEPA that the number of permitted non-insignificant emission units was reduced from 29 to 26.

Insignificant sources listed in the Title V permit may or may not have permit conditions or reporting requirements depending on the regulatory qualifications that categorizes a source as insignificant. Insignificant sources that were specifically issued a Permit-to-Install must be evaluated individually prior to commencing work to assure that the terms and conditions of the issued Permit-to-Install are maintained. Insignificant sources that were permitted-by-rule may be modified or relocated without notification provided the terms and conditions of the permitted-by-rule are maintained. Insignificant sources that are *de minimis* or to which only generally applicable requirements apply may undergo additions, removals, and relocations and do not require a modification of the Title V permit provided the changes do not exceed insignificant emission levels.

Insignificant emission levels are defined in Ohio Administrative Code (OAC) rule 3745-77-01(V)(3) to be less than or equal to 5 tpy of any regulated air pollutant other than a Hazardous Air Pollutant and not more than 20 percent of an applicable major source threshold. Changes to insignificant sources are handled as routine administrative changes through air profile updates submitted through Air Services to the OEPA, Division of Air Pollution Control.

An Air Conformity Applicability Analysis was prepared for the Proposed Action. This analysis is discussed in Section 4 and provided in **Appendix C**.

### 3.3 Noise

#### 3.3.1 Definition of the Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the source type, characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). Decibels are used to characterize sound levels that can be sensed by the human ear. “A-weighted” decibels (dBA) incorporate an adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. All sound levels analyzed in this EA are A-weighted.

Single-event noise, such as an overflight, is described by the sound exposure level (SEL). Cumulative noise levels, resulting from multiple single-events, are used to characterize community noise effects from aircraft or airfield environment, and are measured in the DNL metric, as described in Section 3.1.1. A general discussion of these metrics is provided below and a detailed explanation is provided in **Appendix D**.

#### Sound Exposure Level

The SEL measurement describes a noise event, such as an aircraft overflight, comprising a period of time when an aircraft is approaching a receptor and noise levels are increasing, the instant when the aircraft is closest to the receptor and the maximum noise level is experienced, and the period of time when the aircraft moves away from the receptor resulting in decreased noise levels. SEL is a measure that accounts for both loudness and duration of a noise event.

The SEL metric relates to a single event, which is useful when calculating the noise effects of aircraft flyovers. Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft and engines at different power settings at various phases of flight. These values form the basis for the individual-event noise descriptors at any location, and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings. **Table 3-2** provides SEL values at various altitudes for aircraft operating directly over head at various speeds and power settings depending on aircraft type (values in the table represent averages).

**Table 3-2. SEL dB Values for Aircraft Operating in the Vicinity of WPAFB**

Altitude (feet AGL)	C-5 <sup>1</sup>	C-17 <sup>1</sup>	KC-135R <sup>1</sup>	F-16C <sup>1</sup>
200	118.5	107.6	102.3	100.9
500	111.7	100.2	95.9	94.4
1,000	105.8	93.4	90.8	89.0
2,000	98.9	85.1	85.1	82.9
3,150	93.4	79.1	80.8	78.4
5,000	86.5	73.0	76.0	73.3

<sup>1</sup> Day based on steady, level flight and using Omega 10.9 aircraft profile data from actual overflight noise measurements. Omega 10.9 is a standalone DoD noise-modeling program that allows the user to retrieve data from the NOISEMAP database.

AGL = above ground level.

Source: 1995 AICUZ Study

### Day-Night Average A-Weighted Sound Level

The DNL noise metric incorporates a “penalty” for nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. The DNL values are obtained by averaging aircraft single event SEL values for a given 24-hour period. DNL is the preferred noise metric of U.S. Department of Housing and Urban Development (HUD), Federal Aviation Administration (FAA), USEPA, and DoD for modeling aircraft noise in airport environs.

Most people are exposed to sound levels of DNL 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below DNL of 65 dBA (U.S. Department of Transportation [USDOT] 1980).

Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments and that there is a consistent relationship between DNL and the level of annoyance. The “Schultz Curve” (discussed in **Appendix D**) shows the relationship between DNL noise levels and the percentage of the population predicted to be highly annoyed.

### Noise Criteria and Regulations

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Guidelines and regulations that are relevant to the project are described below.

According to USAF, FAA, and HUD criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the noise exposure exceeds DNL of 75 dBA, “normally unacceptable” in regions exposed to noise between the DNL of 65 to 75 dBA, and “normally acceptable” in areas exposed to noise where the DNL is 65 dBA or less. The Federal Interagency Committee on Noise developed land-use compatibility guidelines for noise in terms of DNL (USDOT 1980). DNL is

the metric used by the USAF in determining noise impacts of military airfield operations for land use planning.

USAF land use compatibility guidelines (relative to DNL values) are documented in the *AICUZ Program Handbook* (USAF 1999). Four noise zones are used in AICUZ studies to identify noise impacts from aircraft operations. These noise zones range from DNL of 65 to 80 dBA and above. For example, it is recommended that no residential uses, such as homes, multifamily dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 dBA.

If sensitive structures are located in areas within a DNL of 65 to 75 dBA, noise-sensitive structures should be designed to achieve a DNL of 25 to 30 dBA interior noise reduction. Noise-sensitive structures might include schools, concert halls, hospitals, and nursing homes. Elevated noise levels in these structures can interfere with speech, causing annoyance or communication difficulties. Some commercial and industrial uses are considered acceptable where the noise level exceeds DNL of 65 dBA. For outdoor activities, USEPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population will be at risk from any of the effects of noise (USEPA 1974).

### Response to Noise Events

Noise can cause a person to be irritated or annoyed. Noise annoyance is defined by USEPA as any negative subjective reaction to noise by an individual or group. DNL is an accepted unit for quantifying annoyance to humans by general environmental noise, including aircraft noise. **Table 3-3** describes the percentage of people who were “highly annoyed” when exposed to various levels of noise measured in DNL. The data shown provides a perspective on the level of annoyance that might be anticipated. For example, 15 to 25 percent of persons exposed on a long-term basis to DNL of 65 to 69 dBA are expected to be highly annoyed by noise events.

**Table 3-3. Percentage of Population Highly Annoyed by Noise Zones**

DNL	Percentage of Persons Highly Annoyed	
	Low	High
65–69 dBA	15	25
70–74 dBA	25	37
75–79 dBA	37	52
80 + dBA	61	61

Source: USAF 2000

Notes: dBA = A-weighted decibel; DNL = Day-Night Average A-Weighted Sound Level

The effects of noise on sleep are of concern, primarily in ensuring suitable residential environments. DNL incorporates consideration of sleep disturbance by assigning a 10 dBA penalty to nighttime noise events (10:00 p.m. to 7:00 a.m.). More typically, single noise events, not average sound levels, correlate with sleep disturbance. A discussion of the relationships between the occurrence of awakening and SEL

is presented in **Appendix D**. Most of these relationships do not reflect habituation and, as such, do not address long-term sleep disturbance effects. Nevertheless, the studies can be used to demonstrate relative differences in interference among different noise-event exposure scenarios.

### 3.3.2 Existing Conditions

#### Aircraft Operations

Existing noise contours were analyzed using results from DoD-approved noise models in the vicinity of WPAFB. The noise contour analysis for WPAFB is presented in the *1995 AICUZ Study for Wright-Patterson AFB, Ohio* (WPAFB 1995a). Based on reasonable assumptions at the time of the 1995 AICUZ Study, a Maximum Mission/Maximum Capacity Scenario was analyzed and incorporated a potential increase in F-16, F-15, C-141, and C-5 aircraft operations. The Maximum Mission Model was intended to capture the maximum feasible operational capacity of the airfield and support activities. Within the limits of accuracy of the model itself, it was meant to provide a good-faith “worst-case” baseline for the surrounding communities’ zoning and land-use decisions, thus limiting encroachment and preserving the capacity of the Base to host additional flying missions.

To confirm that C-5 noise levels were within the Maximum Mission/Maximum Capacity Scenario, data were collected and analyzed in 2008 to produce noise contours that reflected C-5 operations. This analysis confirmed that noise levels were within the Maximum Mission/Maximum Capacity contours established in 1995. Therefore, the contours from 2008 depict current noise conditions and the 1995 contours depict the relevant planning contours.

The C-5 aircraft are currently being phased out at WPAFB and will be replaced with C-17 aircraft. The conversion from C-5 to C-17 aircraft will not increase the footprint of WPAFB’s Maximum Mission/Maximum Capacity Scenario Noise Contours and there is a notable decrease in the amount of noise generated by the C-17 aircraft when compared to the C-5. The overall change in noise is due to the C-17 being a quieter aircraft as well as the decrease in airfield operations and varying flight profiles as compared to the Maximum Mission Scenario.

Because the Maximum Mission Scenario noise contours have been, and are currently, used for noise compatibility planning around the Base, these contours are used as the baseline for the noise analysis in this EA. **Figure 3-1** depicts the baseline noise contours presented in the 1995 AICUZ Study (WPAFB, 1995a).

No noise-sensitive receptors were identified in the AICUZ. There have been no recent complaints regarding aircraft noise. Aircrews limit their routes to the south and east as much as possible.

According to the AICUZ study, Treatment Site A at Wright Memorial is located in the <65 dB noise zone. Treatment Sites 1A and B in areas southwest of the runways are located in the 80 dB (and above)

range, while Treatment Sites 2, 3, and 4 are located in the 65 to 75 dB zone. Treatment Sites 5 and 6, northeast of the runways, are located in the 80 dB (and above) noise zone, while the remaining treatment sites in the Sandhill Area are within the 65 to 80 dB range. These ranges represent existing conditions to which potential noise levels from removing and pruning of trees can be compared.

### **3.4 Geology and Soils**

#### **3.4.1 Definition of the Resource**

Geological resources consist of the earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography, soils, geology, minerals, and, where applicable, paleontology. Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Hydrogeology extends the study of the subsurface to water-bearing structures. Hydrogeological information helps in the assessment of groundwater quality and quantity and its movement.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soils properties must be examined for their compatibility with particular construction activities or types of land use.

#### **3.4.2 Existing Conditions**

##### **Topography and Geology**

The topography of Area A is flat with some portions located within the 100-year flood-plain of the Mad River. The highest elevations on the Base are in Area B and occur along a bedrock ridge that extends from the southeast corner of Area B to the Wright Memorial. The majority of the base is on the broad alluvial plain of the Mad River Valley, which overlies Ordovician-age Richmond shale and limestone bedrock (WPAFB 2001). The land surface elevation on Base ranges from approximately 760 to 980 ft above mean sea level (MSL) (WPAFB 2001).

WPAFB is within the glaciated till plain region of southwestern Ohio, an area within the Central Lowlands Physiographic Province. The Central Lowlands province is characterized by low rolling hills, level plains, and flat alluvial valleys (WPAFB 2007a).

## **Natural Hazards**

The state of Ohio is characterized by a low level of seismic activity (U.S. Geological Survey [USGS] 2008). The Dayton, Ohio, area does not typically experience earthquakes because of its location in relation to fault zones (Hansen 2002). Northwest Ohio had a series of historic earthquakes in the late 1800s to mid 1900s. The majority of these earthquakes were located in Auglaize and Shelby counties, which are approximately 45 miles from Greene County, Ohio (Hansen 2002), with the greatest instrumented magnitude recorded between 5.0 and 5.4 (USGS 2010). On July 23, 2010, a 5.0 magnitude earthquake originating along the Quebec-Ontario border was felt in Dayton and surrounding areas.

## **Soils**

Surface soil at WPAFB formed on unconsolidated deposits, primarily alluvium, glacial outwash, glacial till, and loess (WPAFB 2007a). Development and substantial earthmoving activities have altered the natural soil characteristics at WPAFB, making precise classifications difficult. The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) mapped most of WPAFB as urban land complexes.

### ***Wright Memorial Area***

According to the USDA Soil Conservation Service (SCS) soil survey of Greene County, Ohio (USDA 1978), soils in the area of the Wright Memorial consist of the Miamian series. These soils consist of nearly level to very steep, well-drained soils that formed in medium-textured glacial till. These soils are on uplands throughout the county.

Available water capacity is moderate and permeability (the ability for water to pass through a soil) is moderately slow. The compact till tends to limit roots to a moderate depth. Specifically, the soil at the Wright Memorial is of the Miamian-Urban land complex, undulating. This soil is characterized by generally rapid runoff and the potential for erosion on disturbed areas is high.

### ***Riverview Area***

The soils of Treatment Sites 2, 3, and 4 are of the Sloan-Fill land complex. This complex is made up of nearly level soil on floodplains where as much as 50 percent of the original soil has been covered by fill. The main area of the complex is on WPAFB. It is specifically in runways, taxiways, and land adjacent to these uses. The fill areas have 3 to 5 ft of fill material, mostly Sloan soil and some Westland and Linwood soils. The fill material is generally mineral soil, organic material, and other organic or inorganic debris from various sources. The parts of the mapping unit that are not covered by fill are mostly Sloan silty clay loam (USDA 1978).

The soils of Treatment Sites 1A and B are of the Linwood series. The Linwood series consists of black, very poorly drained organic soils 16 to 50 inches thick. These soils are in depressions in the flood plains or at the margins of glacial outwash valleys below upland seeps. Available water capacity is high, and

permeability is rapid in the organic layer and moderate in the mineral material. These soils have a high water table for most of the year and are commonly ponded. Many areas are kept saturated by water from springs or seeps from adjacent uplands or from underground aquifers. The rooting zone is moderately deep or deep in areas that have been drained.

### ***Sandhill Area***

#### **Sites C through K, and 7**

Treatment Sites C through K and Treatment Site 7 are located adjacent to and on the slopes of Sandhill. Sandhill Road divides this region into north and south areas of varying soil composition. The predominant surficial soils in the southern Sandhill area are different from the northern area. According to the soil survey of Greene County (USDA-SCS 1978), two surface soil types primarily comprise the southern portion of Sandhill.

The Eldean-Urban land complex is comprised of rolling land where Eldean soils have been largely altered or covered by grading and digging operations. Eldean series soils consist of nearly level to moderately steep, well-drained soils that formed in glacial outwash deposits. Available water capacity is moderate. Permeability is moderate in the subsoil and rapid in the underlying stratified sand and gravel. Eldean soils dry out early in the spring. Eldean-Urban slopes are predominantly between 6 and 12 percent. The surface layer of the disturbed soil commonly has a low organic matter content and poor tilth. The potential for erosion is high, particularly when the soil is bare of vegetation during construction periods.

The second soil type is the Ockley silt loam, 2 to 6 percent slopes. The Ockley series consists of nearly level to gently sloping, well drained soils that formed a thin loess mantle and loamy glacial outwash underlain by sand and gravel at a depth of 40 to 60 inches. Permeability is moderate in the subsoil and rapid in the underlying sand and gravel. Runoff is moderate to slow. Water seldom ponds on the surface for prolonged periods. Ockley silt loam soil occurs in areas that are commonly round in shape and 3 to 10 acres in size.

#### **Sites 5 and 6**

The soil at Treatment Sites 5 and 6 is also of the Ockley series but of the Ockley-Urban land complex. This soil is characterized by nearly level and gently sloping Ockley soils that are on stream terraces and that have been developed for residential and industrial use. Most areas have been disturbed or buried by earthmoving and fill operations. Erosion is a hazard on construction sites, particularly in the gently sloping areas. Permeability is rapid in the underlying sand and gravel.

### **3.5 Water Resources**

#### **3.5.1 Definition of the Resource**

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.

##### **Groundwater**

Groundwater consists of the subsurface hydrologic resources. It is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

##### **Surface Water**

Surface water resources consist of lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. Storm water is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade lakes, rivers, and streams. Storm water flows, which may be exacerbated by high proportions of impervious surfaces associated with buildings, roads, parking lots, and airfields are important to the management of surface water. Storm water systems convey precipitation away from developed sites to appropriate receiving surface waters. Higher densities of development, such as those found in Area B, require greater degrees of storm water management because of the higher proportions of impervious surfaces that occur in urban centers.

##### **Floodplains**

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. Such lands might be subject to periodic or infrequent inundation due to rain or melting snow. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year.

EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps, which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific step-by-step process must be followed to comply with EO 11988 outlined in the FEMA document *Further Advice on EO 11988 Floodplain Management*. As a planning tool, the NEPA process incorporates floodplain management through analysis and public coordination of the EA.

All floodplain related construction activities must be coordinated with the Miami Conservancy District (MCD) for approval. The MCD through the *Land Use Agreement* (dated January 7, 2000) and the MCD *Policy and Procedure for Permits in Retarding Basins*, regulates all construction on land within the Huffman Dam Retardation Basin and more than 5 ft below the spillway elevation of 835 ft, above MSL.

### **3.5.2 Existing Conditions**

#### **Groundwater**

WPAFB is regionally located in the Great Miami River Valley, which is filled with glacial deposits of sand and gravel. The glacial outwash deposits are very permeable and exhibit high transmissivity and hydraulic conductivity. The resulting aquifer system, collectively called the Miami Valley Buried Aquifer, is a highly productive source of water for the millions of people in southwest Ohio. The USEPA designated the Miami Valley Buried Aquifer system as a sole-source aquifer in 1988, meaning that all new projects must be approved by USEPA Region 5 to ensure its continued use as a drinking water supply (53 Federal Register 15876). The buried aquifer system provides drinking water for more than 1.6 million people in southwest Ohio (Debrewer et al. 2000).

Groundwater can also be found in large volumes in the Silurian-age (415 to 465 million years ago) limestone and dolomite bedrock underneath the buried valley aquifer system. Private wells and smaller public systems typically use this bedrock aquifer because, though not as productive as the buried aquifer, it is adequate for such uses (MCD 2002). Underneath the limestone and dolomite bedrock is Ordovician-age (465 to 510 million year ago) bedrock shales and limestones of the Richmond Group. The lower bedrock aquifer system generally produces less than 5 gallons per minute (gpm) and is only productive enough for livestock use.

The buried valley aquifers coincide with the present Great Miami River and its tributaries. Water underground generally follows the same flows as surface waters with upland areas serving as recharge areas and groundwater divides (MCD 2002). At WPAFB, the Mad River follows the course of the Mad River Buried Aquifer, part of the Miami Valley Buried Aquifer system. South of Huffman Dam (a flood control dam that is managed by the MCD), a till zone divides the Mad River Buried Aquifer into an upper water table unit and a lower confined unit. However, north of the dam and in other parts of the buried valley aquifer, till zones occur less frequently as discontinuous, less-permeable zones within the more permeable outwash deposits (WPAFB 1995b).

Vertical hydraulic gradients vary throughout the area, and both upward and downward gradients have been recorded in nested monitoring wells at WPAFB. Most of the wells in the outwash deposits yield between 750 and 1,500 gallons gpm, but can vary from less than 200 to more than 4,000 gpm (WPAFB 1995b). The City of Dayton groundwater production wells at Huffman Dam are screened at depths of over 100 ft below ground surface. Groundwater at WPAFB is typically hard due to the limestone and dolomite bedrock (Debrewer et al. 2000).

## Surface Water

WPAFB is in the Mad River Valley. The Mad River originates approximately 40 miles north of Springfield, Ohio, and flows south and southwest past WPAFB to its confluence with the Great Miami River in Dayton, Ohio. The Great Miami River flows into the Ohio River, which flows into the Mississippi River. Sustained flow of the Mad River originates from groundwater discharge of glacial deposits upstream of Huffman Dam.

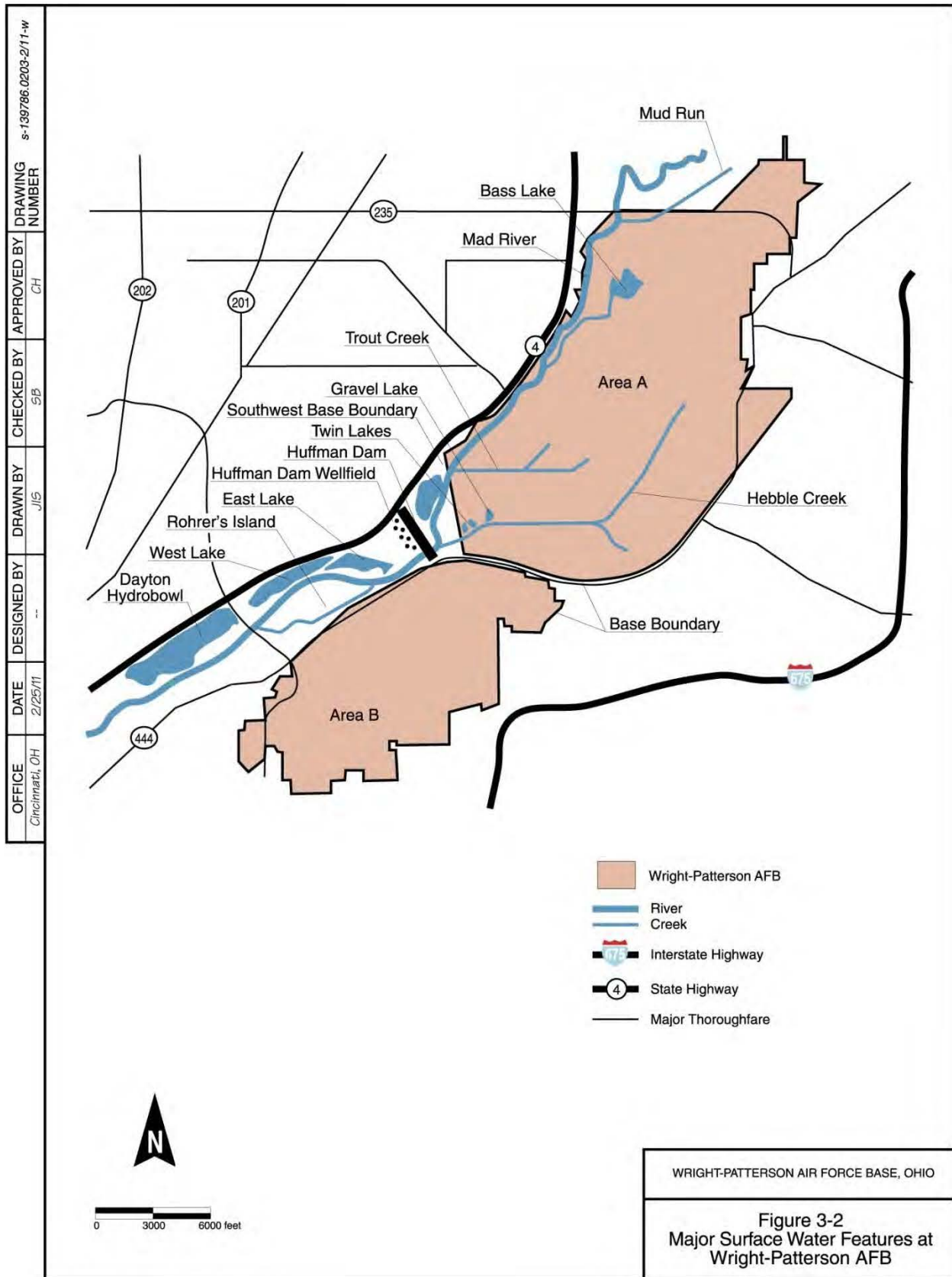
The Mad River approaches WPAFB from the north and flows along the northern border of Area B in the vicinity of Gate 1B. OEPA has divided the Mad River watershed into five areas: the headwaters; Mad River between Kings and Chapman Creeks; Buck Creek; Mad River from Chapman to Mud Creeks; and the lower Mad River (Mud Creek to the Great Miami River). Mud Creek enters the Mad River 2,000 ft due north of the SR 235 bridge, near the southern portion of Area A. WPAFB lies adjacent to the northernmost portion of the lower Mad River segment.

OEPA has determined that segments of the Mad River watershed do not support designated aquatic life uses for Warmwater Habitat, Modified Warmwater Habitat, Coldwater Habitat, or the Primary Contact Recreational use (OEPA 2009). Specifically, OEPA has identified the lower segment of the Mad River, adjacent to WPAFB, as an impaired water under Section 303(d) of the Clean Water Act (CWA) for not meeting aquatic life and recreation use standards (OEPA 2010).

The USEPA has established the total maximum daily load of effluent (TMDL) for the Mad River in the *Mad River Total Maximum Daily Loads for Sediment and Turbidity* (USEPA 2007). A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates pollutant loadings among point and nonpoint pollutant sources. The TMDL for the Mad River watershed has been set at 120 percent of natural sediment loading. According to the report, the natural sediment loading in the basin is approximately 894 tons/mi<sup>2</sup>/yr based on an annual average.

There are several recreational lakes in Area A of WPAFB. The largest is Bass Lake located in the northeastern corner of Area A. The Twin Lakes Recreational Area, comprised of East Twin Lake, West Twin Lake, and Gravel Lake, is located in the southwest corner of Area A. Trout and Hebble creeks are minor surface water features located in Area A. They flow in a general westward direction into the Mad River. Mud Run is another small surface water feature joining the Mad River along the Base's northern border. **Figure 3-2** presents the major surface water features at WPAFB.

The WPAFB Storm Water Pollution Prevention Plan (SWPPP) (prepared to comply with the CWA and the Ohio Water Pollution Control Act) provides detailed descriptions of storm drainage areas and their associated outfalls, potential storm water pollution sources, and Best Management Practices (BMPs) to reduce potential storm water contamination (WPAFB 2007b). The SWPPP is currently under revision by the Base. There are two OEPA permits that cover the WPAFB storm water program: an industrial permit



(NPDES Permit No. 11O00001) and a municipal permit (NPDES General Permit No. OHQ000002). The SWPPP provides specific BMPs to prevent surface water contamination from activities such as storing and transferring of fuels, storage of coal, use of deicing fluids, storage and use of lubrication oils and maintenance fluids, solid and hazardous waste storage, and salt storage. Some storm water also enters the Base from surrounding communities and areas (WPAFB 2001).

WPAFB's NPDES permit became effective in October 2010. Twenty-three defined drainage or "Outfall Areas" occur on Base (WPAFB 2007b). The following sections discuss the site-specific surface water features in the vicinity of each site.

### ***Wright Memorial Area***

The Wright Memorial is located on a topographical high point for the region and a prominent surface water feature is not present at the site. Approximately 1,200 ft north of the Wright Memorial is the Mad River and Huffman Dam. The Wright Memorial is located in storm sewer Outfall Areas 4 and 5 (**Figure 3-3**). Outfall Area 4 drains to the north and west towards NPDES Outfall 004 just north of Springfield Pike, which feeds into the Mad River. Outfall Area 5 drains to the north and east towards NPDES Outfall 005 and runoff in this area eventually reaches Hebble Creek. Outfalls 004 and 005 are monitored for pH, total suspended solids (TSS), and oil and grease.

### ***Riverview Area***

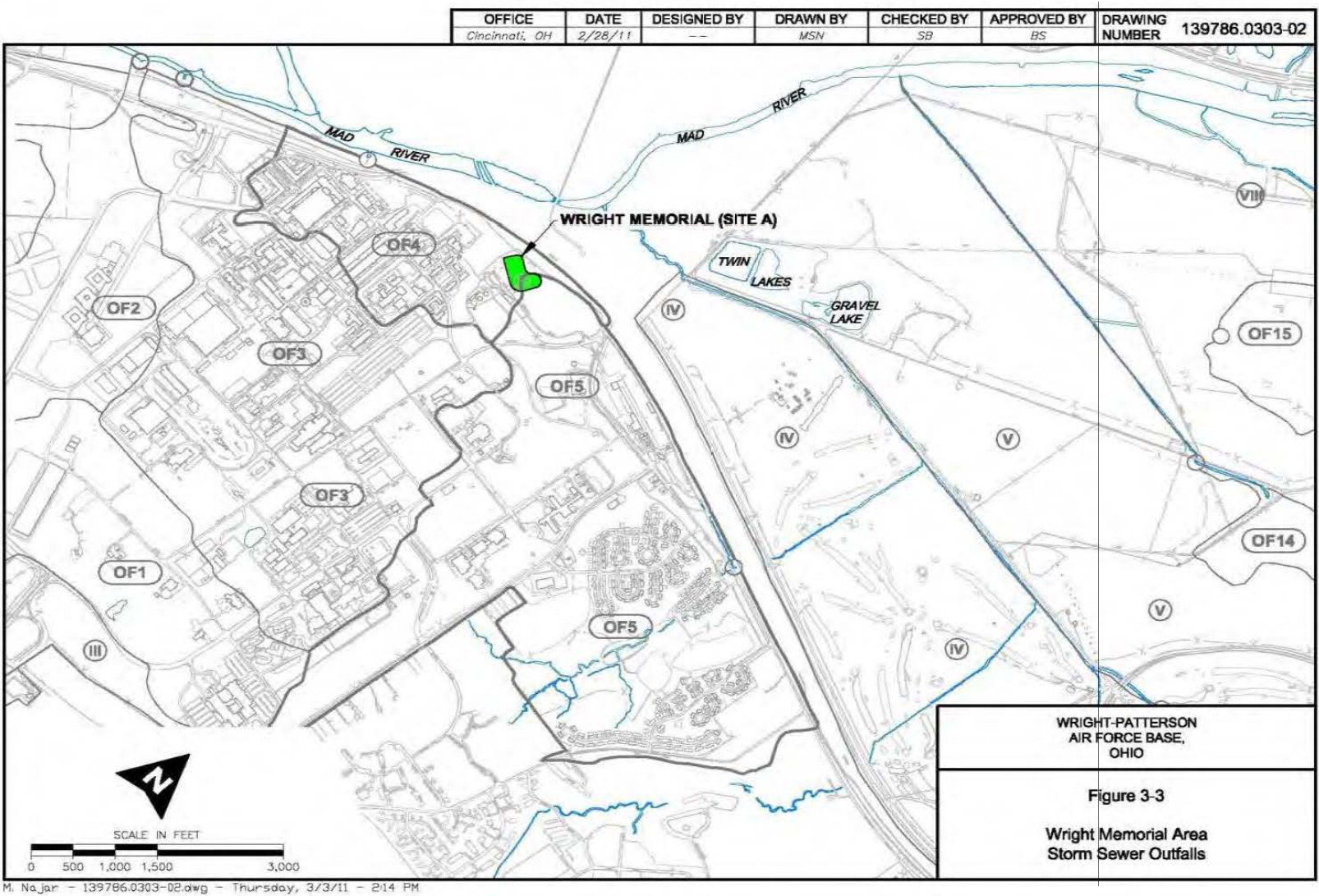
Treatment Sites 1A and B include the drainage ditch tributary to Trout Creek and a 0.4-mile section of Trout Creek. Outfall Area 15 is located along the eastern edge of Treatment Sites 1A and B (**Figure 3-4**). Outfall Area 15 drains west towards NPDES Outfall 015 and discharges to Trout Creek along Symmes Road. Outfall 015 is not currently sampled or monitored under the NPDES permit. Drainage from Treatment Sites 1A and B flows west into Trout Creek then into the Mad River.

Treatment Sites 2, 3, and 4 are located near the Mad River and include or border Landfills (LFs) 11 and 12 (**Figure 3-4**). Treatment Site 2 also contains a short section of small tributary to the Mad River. These three sites are not located within any storm sewer outfall areas.

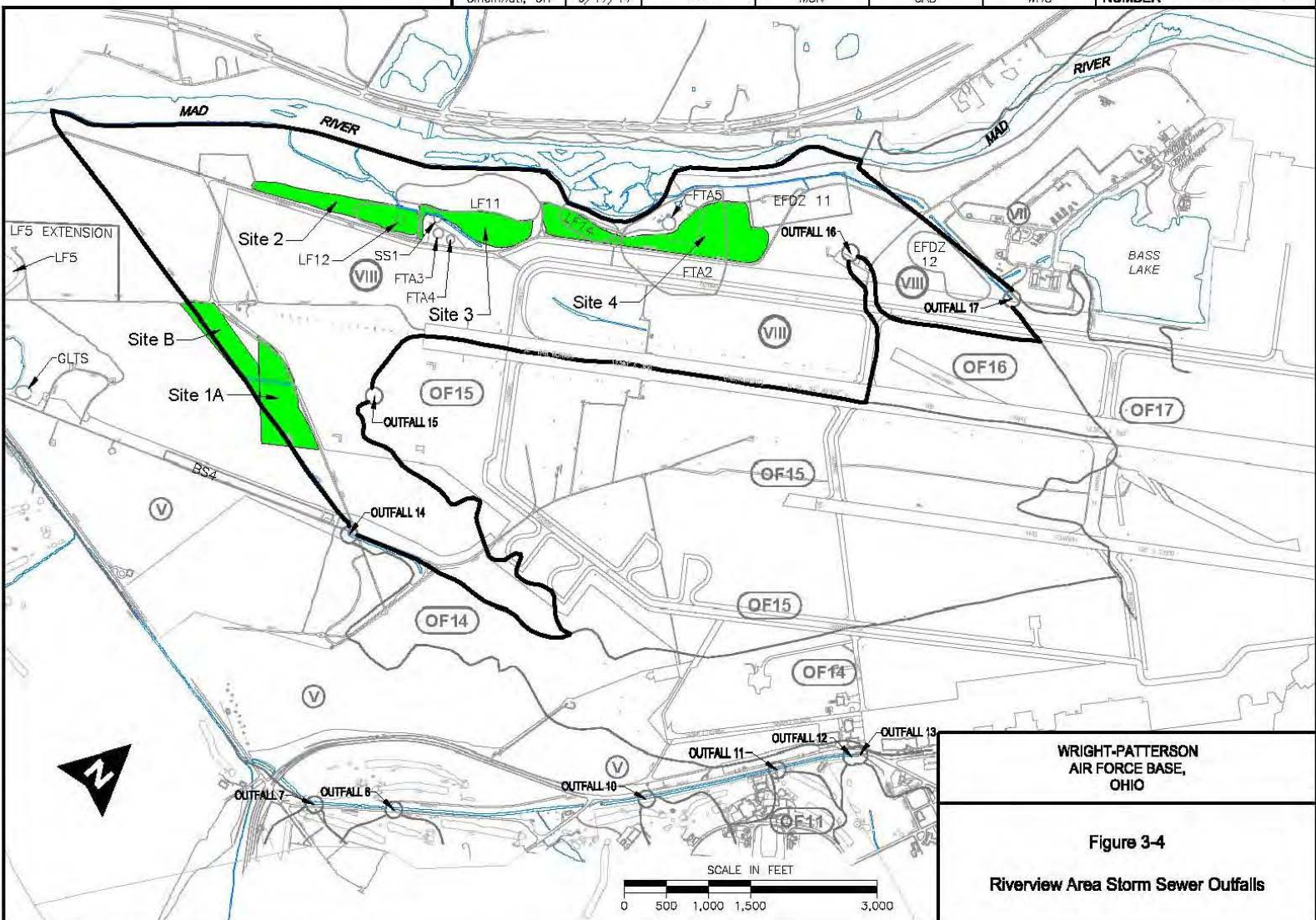
Trout Creek and Hebble Creek (south of Treatment Sites 1A and B) drain most of Area A. These creeks flow in a generally westward direction to the Mad River, which flows in a southerly direction.

### ***Sandhill Area***

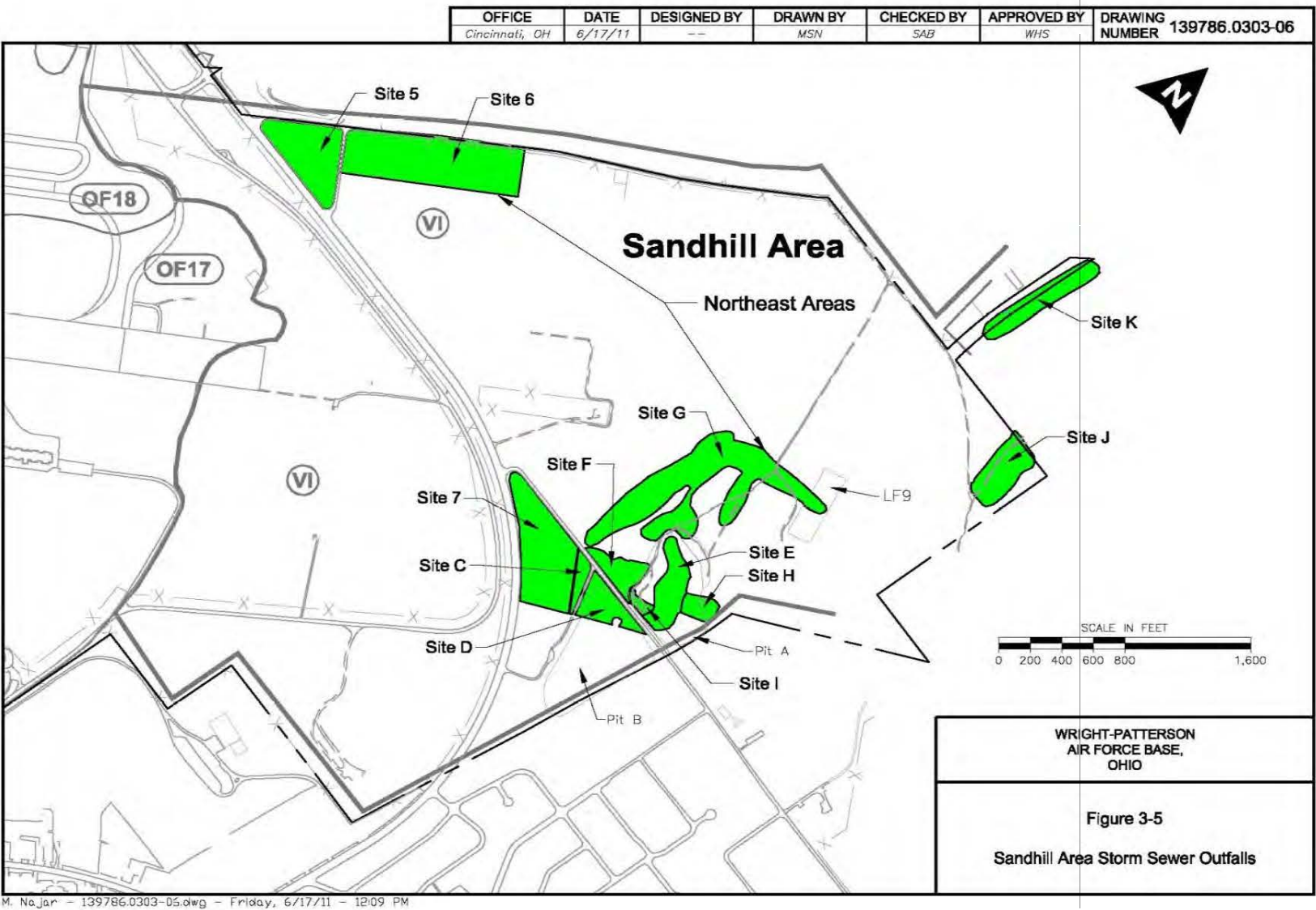
Surface water features in the vicinity of the northeast sites and Sandhill include an unnamed drainage located approximately 500 ft due north of Sandhill that drains west to Mud Run. This drainage receives surface water runoff from the northern slope of Sandhill and from the residential area in the immediate vicinity. Surface water flow in the drainage is to the north. The Mad River and several gravel pit lakes are located immediately west of Mud Run (**Figure 3-5**).



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	6/17/11	---	MSN	SAB	WHS	139786.0303-05



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The treatment sites in the Sandhill Area are not located within any storm sewer outfalls. Drainage from these areas discharges to the Mad River.

### **Floodplains**

A large portion of WPAFB lies within the Mad River floodplain. The 10-year floodplain is at 804.7 ft above MSL, and the 100-year floodplain is at 814.3 ft above MSL.

### ***Wright Memorial Area***

Treatment Site A is at an elevation of approximately 925 ft MSL, which is above the 100-year floodplain elevation of 814.3 ft MSL.

### ***Riverview Area***

The sites southwest of the runways are at elevations ranging between 790 ft MSL to 800 ft MSL. All of these sites are relatively flat and lie within the 100-year floodplain.

### ***Sandhill Area***

The land surface at the Sandhill sites and the other northeast area sites in this vicinity ranges in elevation from approximately 830 ft MSL to approximately 900 ft MSL (USGS 1992). The land surface at the remaining northeast area sites located along Johnson Road ranges from approximately 815 ft MSL to 820 ft MSL. All sites northeast of the runways, including Sandhill, are above the 100-year floodplain.

## **3.6 Biological Resources**

### **3.6.1 Definition of the Resource**

Biological resources include native or naturalized plants and animals, and the habitats, such as wetlands, forests, and old fields, in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the USFWS or a state.

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat detention, and erosion protection. Wetlands are protected as a subset of the “the waters of the United States” under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands).

The U.S. Army Corps of Engineers (USACE) defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR Part 328).

Under the Endangered Species Act (ESA) (16 U.S.C. 1536), an “endangered species” is defined as any species in danger of extinction throughout all or a large portion of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. The USFWS also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

### 3.6.2 Existing Conditions

#### Vegetation

Natural vegetative communities on WPAFB can be divided into five general categories: forest/woodlands (709 acres), prairie (109 acres), old fields (388 acres), wetlands (23 acres), and maintained areas (areas that are routinely mowed; e.g., airfields, parks, roadsides, golf courses, residential lawns, and other green space between buildings).

Vegetation within the treatment sites consists of woodlands, thickets, old fields, and maintained areas. **Table 3-4** presents descriptions of vegetation occurring within the treatment sites. The flora and pattern of vegetation to be disturbed within the proposed treatment sites is common to the Base and the region.

**Table 3-4. Vegetation Within Treatment Sites**

Treatment Site	Vegetation
A	Wright-Memorial, park-like setting with scattered large trees
B	Scrub thicket and tree-lined creek
C, H, I, K, 5	Scrub thicket
D, E, F, G, I, 6	Scrub thicket with scattered trees
7	Mowed/maintained ground
1A	Combination of old field, scrub thicket, and woodland
2	Old field with tree-lined creek
3	Mowed/maintained ground and scrub thicket
4	Mowed/maintained ground and woodland

WPAFB has been awarded the Arbor Day Foundation’s Tree City USA designation for 14 years. The Tree City USA award originates from the National Arbor Day Foundation, an organization founded in 1976 dedicated to tree plantings, conservation, and promotion of community forestry (WPAFB 2009a). Benefits of being a Tree City designee include creating a framework for action, education, a positive public image, and citizen pride (Arbor Day 2010).

The woodland communities include riparian forests occurring in the Riverview area and dominated by boxelder (*Acer negundo*), eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*) with subordinants including green ash (*Fraxinus pennsylvanica*) and honey locust (*Gleditsia triacanthos*). The scrub thickets occur in both the Riverview and Sandhill areas and largely consist of amur honeysuckle (*Lonicera maackii*). The old fields are largely dominated by

species common to these communities on base and in the area. Dominants include common goldenrod (*Solidago canadensis*), tall ironweed (*Vernonia gigantea*), and broom-sedge (*Andropogon virginicus*). The maintained areas are largely dominated by weedy and mostly non-native species like tall fescue (*Festuca elatior*), smooth crabgrass (*Digitaria ischaemum*), red clover (*Trifolium pretense*) and common dandelion (*Taraxacum officinale*).

### **Wetlands**

EO 11990, *Protection of Wetlands*, May 24, 1977, directs Federal agencies to consider alternatives to avoid adverse effects on and incompatible development in wetlands. Federal agencies are directed to avoid new construction in wetlands, unless the agency finds there is no practicable alternative and the proposed construction incorporates all possible measures to limit harm to the wetland.

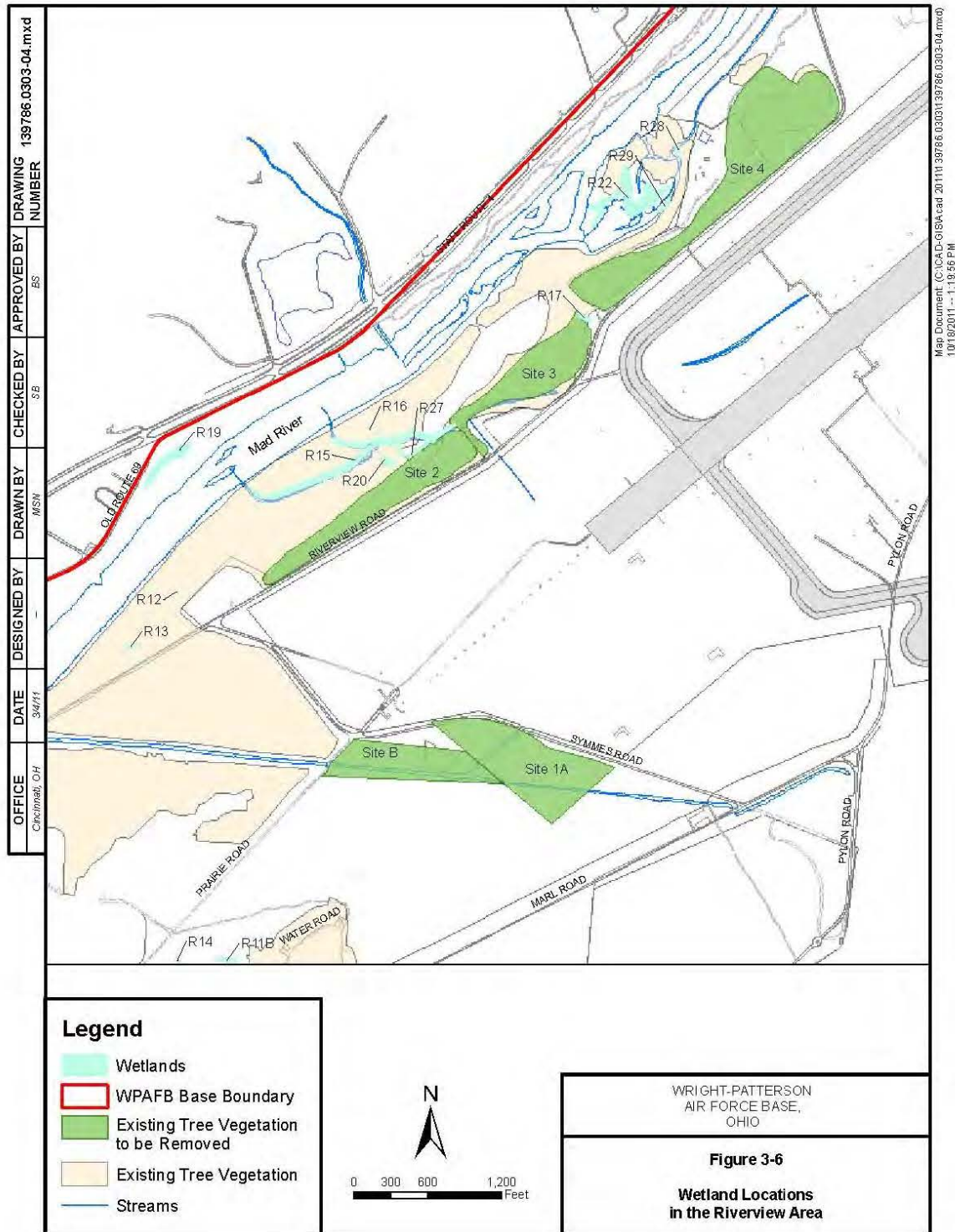
The CWA sets the basic structure for regulating discharges of pollutants to U.S. waters. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States, including wetlands. The National Wetlands Inventory (NWI), a department within USFWS; USEPA; and the NRCS help in identifying wetlands.

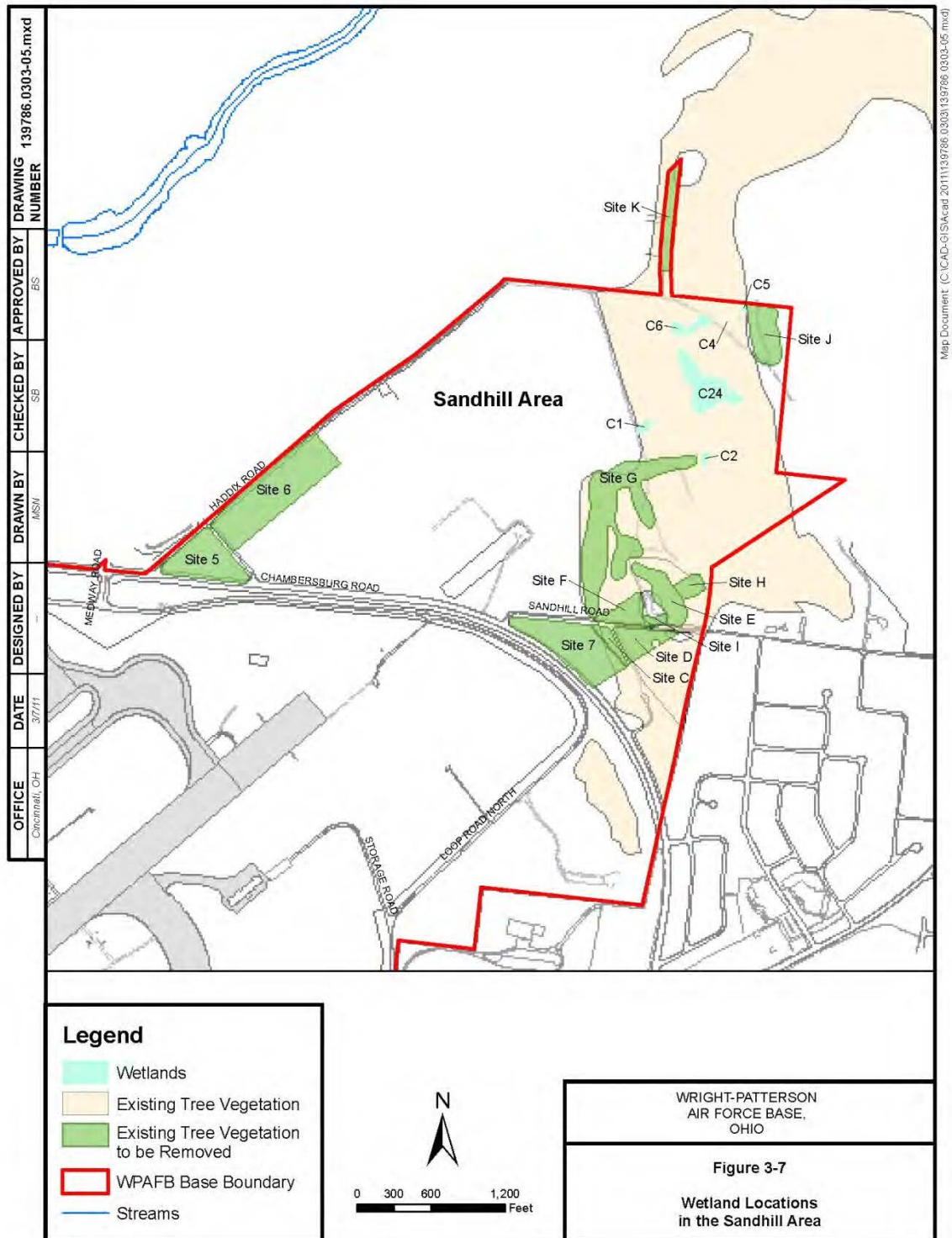
Forested wetlands are dominated by woody plants that are 20 ft tall (or taller) including boxelder, eastern cottonwood, and silver maple. The scrub/shrub wetlands are dominated by woody plants less than 20 ft tall and includes shrubs and young trees including boxelder, gray dogwood, (*Cornus racemosa*), and silky willow (*Salix sericea*). Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytic plants. The emergent wetlands are dominated by herbaceous plants such as cattail (*Typha latifolia*) false nutsedge (*Cyperus strigosus*), Frank's sedge (*Carex frankii*), and soft rush (*Juncus effusus*).

A thorough base-wide wetland survey was conducted in June and July of 2004 and documented in the 2005 Wetland Management Plan (BHE 2005) and updated in 2009. A total of 23 wetlands were identified in Area A. Three of the wetlands identified in Area A were noted as Category 3 wetlands. Category 3 wetlands are considered to be significant wetlands in Ohio due to superior quality habitat, superior hydrological or recreational function, or other important feature such as occurrences of either Federal- or state-listed threatened or endangered species. Wetlands located in the vicinity of the Riverview Area are shown in **Figure 3-6**. Wetlands located in the vicinity of the Sandhill Area are shown in **Figure 3-7**. No wetlands are located in the vicinity of the Wright Memorial treatment sites.

### **Wildlife**

WPAFB is home to a diverse assemblage of animals. Many animals are only present at WPAFB for a short period while migrating between winter and summer habitats, while others are year-round residents. Common mammals on WPAFB include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), groundhog (*Marmota monax*), and eastern fox squirrel (*Sciurus niger*).





Common birds on Base include European starling (*Sturnus vulgaris*), red-tailed hawk (*Buteo jamaicensis*), horned lark (*Eremophila alpestris*), American robin (*Turdus migratorius*), and American goldfinch (*Carduelis tristis*).

Because birds as well as mammals pose a hazard to airfield and aircraft operations, the Air Force has established bird air strike hazard and wildlife management plans. WPAFB implements a comprehensive Bird/Wildlife Aircraft Strike Hazard (BASH) plan that involves prevention, monitoring, and reduction of bird/wildlife hazards (WPAFB 2007a).

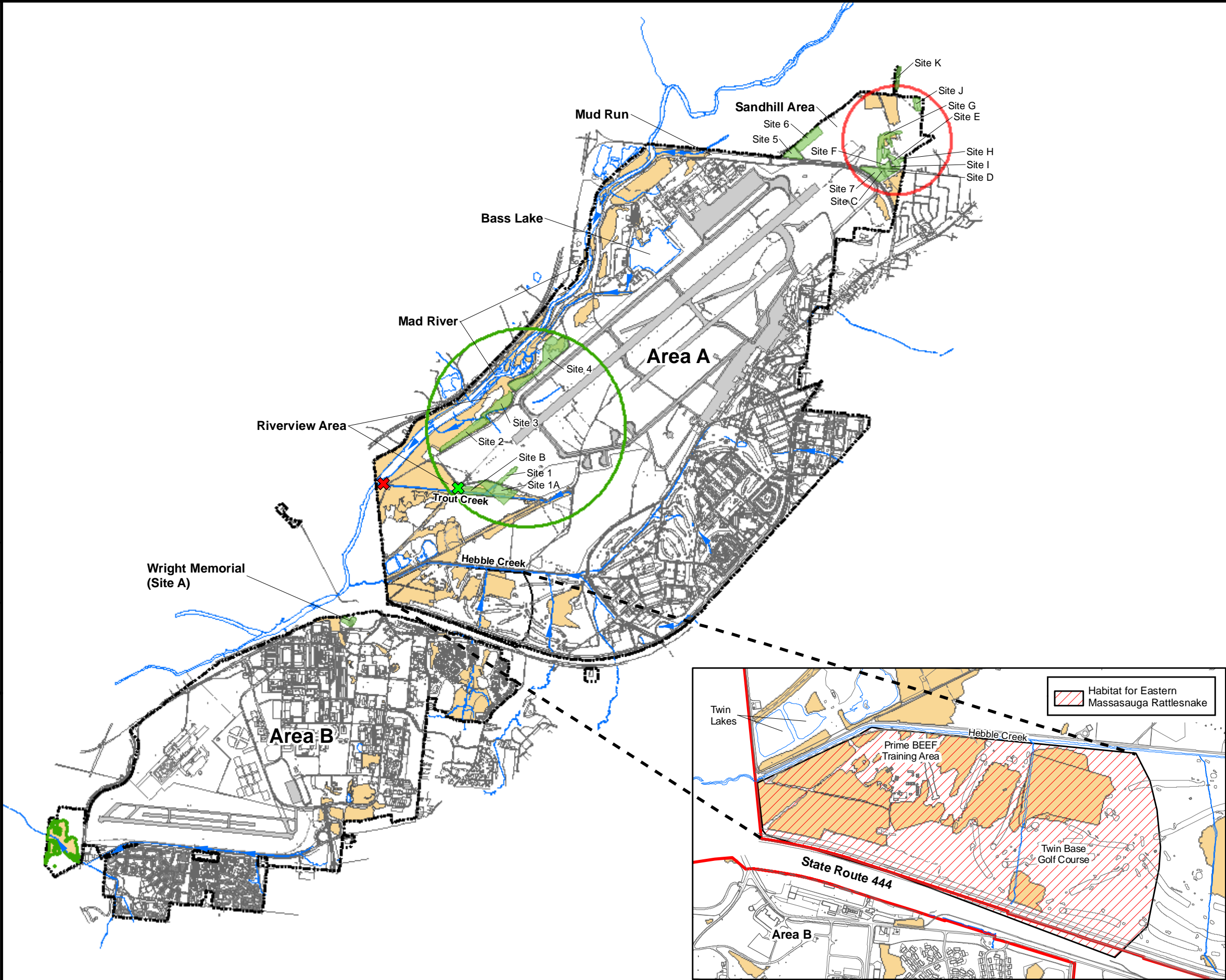
Reptiles and amphibians occurring on the Base and within the proposed project areas include common species like American toad (*Bufo americanus*) and eastern garter snake (*Thamnophis s. sirtalis*).

### **Threatened and Endangered Species**

Compliance with AFD 32-70 and AFI 32-7064 requires all Air Force properties to protect species classified as endangered or threatened under the ESA and to comply with Ohio Revised Code (ORC) 1531.25 and its implementing regulations for species listed by the state as threatened and endangered. To comply with these requirements, WPAFB developed an Endangered Species Management Plan (BHE 2001). The WPAFB Integrated Natural Resources Management Plan (INRMP) (WPAFB 2007a) contains a recent summary of threatened and endangered species on Base. Locations of habitat for threatened and endangered species are shown in **Figure 3-8** for the Wright Memorial, Riverview, and Sandhill areas.

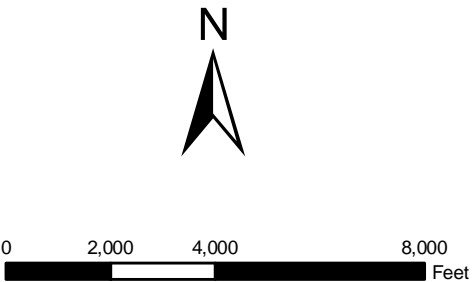
Coordination with the ODNR was initiated as part of this EA. According to a letter dated April 19, 2011 (**Appendix A**), several species were identified in the ODNR's Biodiversity Database as being located within or in close proximity to the project areas. Of these, the only species known to occur within the project areas are the federally-endangered Indiana bat (*Myotis sodalis*), the state-potentially threatened Great Plains ladies'-tresses (*Spiranthes magnicamporum*), the state-endangered Ear-leaved foxglove (*Agalinis auriculata*), and the state-threatened Upland Sandpiper (*Bartramia longicauda*). ODNR also indicated the presence of the state-endangered and federal candidate eastern massasauga rattlesnake (*Sistrurus catenatus*) in the proposed project areas.

The only federally-listed species known to have potential foraging or summer roost habitat within or in the vicinity of the proposed project areas is the Indiana bat. Documented home ranges of Indiana bats include areas of concentrated activity within approximately 1 mile of the confluence of Trout Creek with the Mad River and Hebble Creek with the Mad River (WPAFB 1995b, BHE/IT 1999). This species forages during the summer along stream corridors associated with the Riverview Area including Treatment Sites B, 1A, 2, 3, and 4. It is likely the species utilizes forested habitat throughout this general vicinity.



### Legend

- WPAFB Base Boundary
- Rivers, Streams (flow directions), and Lakes
- Juvenile female capture site
- Mature female capture site
- Potential Habitat for Indiana Bat within Glideslope, Transitional, and Clear Zone Areas.
- Treatment Sites
- Potential Habitat for Great Plains Ladies-Tresses and Ear-Leaved Foxglove in or around Treatment Sites G and J
- Potential Summer Roost Habitat for Indiana Bat in or around Treatment Sites B, 1A, 2, 3, and 4



WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

**Figure 3-8**  
**Threatened and Endangered Species**  
**in the Wright Memorial, Riverview,**  
**and Sandhill Areas**

In July 2000, two Indiana bats (a juvenile female and an adult post-lactating female) were captured along Trout Creek during a base-wide mist net survey (BHE 2001). Radio tracking of these two bats confirmed the presence of a maternity colony in a dead slippery elm (*Ulmus rubra*) in a woodlot on the campus of Wright State University, approximately 2 miles from the nearest treatment site. A known alternate roost (a roost used relatively infrequently or used by fewer bats) is also located on property owned by Wright State University. It is located approximately 1.5 miles from the nearest treatment site. In 2007, a total of 12 sites were mist netted for 2 nights each (Eco-Tech 2007). During this most recent survey, 5 Indiana bates were captured. There are less than one dozen potential summer roost trees within the vicinity of the proposed project area, most occurring within the Riverview area, but none directly within the treatment sites.

The bald eagle is found throughout much of the contiguous 48 states along waterways and impoundments. Since the INRMP was published (WPAFB 2007a), the bald eagle has been removed from the Federal List of Endangered and Threatened Wildlife and Plants (FR Volume 72, Number 130, July 9, 2007). The bald eagle will be monitored for a five-year period and will continue to be protected under the provisions of the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. In the state of Ohio, bald eagles are listed as threatened species (ODNR 2011).

Although bald eagles may be found year round in Ohio, they only occur near WPAFB as rare winter visitors with most recent WPAFB sightings occurring along the Mad River corridor in 1984. During the winter of 2004/2005, one bald eagle was recorded in Greene County, and two in Montgomery County. In the winter of 2005/2006, one bald eagle was observed in Greene County, and no eagles were observed in either Greene or Montgomery Counties during the winter of 2006/2007. Recently, however, a pair of eagles has nested north of Eastwood Metro park/Lake in the vicinity of Rohr's Island well-field, which is west of Gate 1B in Area B, at least one mile west of the Wright Memorial area.

The eastern massasauga rattlesnake is usually found in wet areas including wet prairies, marshes, and low lying areas adjacent to higher ground for foraging. Neither the historic nor current population size nor status of massasauga snakes at WPAFB has been determined. Reports of massasauga sightings have been limited to the Prime Base Engineer Emergency Force (Prime BEEF) Training Area and Twin Base Golf Course in Area A, which is within the southern glide slope (WPAFB 2007a). There is no requirement to survey the proposed project areas for potential habitat because the eastern massasauga is a Federal candidate species. However, a preliminary survey of the Riverview and Sandhill areas did not encounter evidence of burrows (crayfish or small mammals) occurring within open wetlands for winter hibernation with adjacent upland forests for foraging during the summer. In 2010, a survey began and continues in the Sandhill area. Previous surveys have also reported no sightings of the massasauga rattlesnake within the project areas.

Great Plains ladies'-tresses, a rare orchid, is a plant of dry to mesic open areas usually over limestone or dolomite bedrock. Within the Sandhill area project area, there are two known populations (WPAFB 2011a). Neither of these populations occurs within a treatment site but potential habitat does occur within Treatment Sites G and J. The habitat in these areas consists of an open glade-like habitat with scattered flat limestone outcrops and scrub thickets. The open areas are dominated by tall dropseed (*Sporobolus asper*) broom sedge, yellow sweet clover (*Melilotus officinalis*), common goldenrod, and daisy fleabane (*Erigeron annuus*). The scrub thickets are dominated by Russian olive (*Elaeagnus angustifolia*), autumn olive (*Elaeagnus umbellata*), gray dogwood (*Cornus racemosa*), and eastern red cedar (*Juniperus virginiana*). Additionally, the ear-leaved foxglove, a rare annual, hemiparasitic herb, is known from one population in the same vicinity and in close proximity to one population of the Great Plains ladies'-tresses. As with the Great Plains ladies'-tresses, potential habitat does occur within Treatment Sites G and J.

While records indicate the Upland Sandpiper has been observed within the proposed project area, it has not been observed within any of the treatment sites. This species seems to prefer open grasslands, pastures, and especially open areas near airport runways which is where it has been observed at WPAFB. This species would unlikely occur in the wooded treatment sites.

The eastern box turtle (*Terrapene carolina*) is listed as a species of concern in Ohio. While relatively common, it is thought that the numbers of the eastern box turtle has declined due in part to overcollecting and roadkills. Several turtles have been observed in the Sandhill area however, no sitings have occurred in the treatment areas (WPAFB 2011a). Potential habitat for the eastern box turtle occurs within most, if not all, of the treatments sites.

The USFWS was also contacted as part of this EA to request known presence or absence of Federal- and state-listed species that may be located within the project vicinity. The USFWS also conducted a site visit on October 13, 2011, and reviewed portions of the project areas where tree clearing is proposed. The USFWS provided comments of known species in the vicinity of the project area in a letter dated October 21, 2011, noting migratory bird and endangered species. Consultation with the USFWS is provided in **Appendix A**. In addition to the noted ODNR species listed above, the clubshell, snuffbox, and rayed bean (freshwater mussels) were noted by the USFWS as species currently being considered for potential listing as federally endangered.

The clubshell is a Federal- and state-listed endangered species occurring in 12 streams in Kentucky, Pennsylvania, Indiana, Ohio, Michigan, and West Virginia. Surveys by 3D/International, Inc. (1998) and BHE Environmental (1999) documented clubshell subfossil remains at the confluence of Trout Creek and the Mad River and near the confluence of Mud Run and the Mad River (WPAFB 2007a). No sightings of the clubshell have been reported within the project area.

The snuffbox (*Epioblasma triquetra*) occurs in swift current of riffles and shoals over gravel and sand with occasional cobble and boulders. The snuffbox is known to be present in the Stillwater and Little Miami River and drainages where preferred habitat exists. As noted for the clubshell, no sightings of the snuffbox have been reported within the project area.

The rayed bean (*Villosa fabalis*) is generally known to exist in small headwater creeks, but records exist indicating this species has been sited in larger rivers. The rayed bean is usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and the rayed bean is often associated with, and buried under the roots of vegetation, including water willow and water milfoil. The rayed bean is known to exist in perennial streams in Greene and Montgomery Counties where preferred habitat exists. As noted for the clubshell and snuffbox, no sightings of the rayed bean have been reported within the project area.

### **3.7 Cultural Resources**

#### **3.7.1 Definition of the Resource**

As defined by 36 CFR 800.16, historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria. Several Federal laws and regulations govern protection of cultural resources, including the National Historic Preservation Act (NHPA) (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990).

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing) or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., arrowheads and bottles).

Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered for the NRHP. More recent structures might warrant protection if they have potential as Cold War-era resources. Structures less than 50 years in age, and particularly DoD structures in the category of Cold War-era, are evaluated under explicit guidance of the National Park Service Bulletin 22.

The EA process and the consultation process prescribed in Section 106 of the NHPA requires an assessment of the potential impact of an undertaking on historic properties that are within the proposed

project's Area of Potential Effect (APE), which is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." In accordance with Section 106 of the NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the SHPO.

The APE for the Proposed Action includes archaeological resources and buildings located in the Wright Memorial, Riverview, and Sandhill areas. According to the Integrated Cultural Resources Management Plan (ICRMP) for WPAFB, there is one known prehistoric archaeological site listed on the NRHP and located in the immediate project area at the Wright Memorial (WPAFB 2006a). In addition, there are several prehistoric and historic archaeological sites located within the project area; however, based on integrity and disturbed nature and location of these sites, were listed as ineligible for the NRHP. For completion, all sites are summarized below.

### **3.7.2 Existing Conditions**

#### ***Wright Memorial Area***

Wright Memorial is considered a historic landscape. Construction on Wright Memorial began in 1938 and dedication ceremonies took place in 1940. Wright Memorial consists of a formal stone plaza area encircled by trees and 27 acres of landscaped grounds. Ownership of the memorial was transferred to the USAF in 1975 (WPAFB 1991). As seen in **Figures 1-3 and 2-1**, the trees proposed to be pruned are in close proximity to the Wright Memorial and are considered a part of the historic landscape.

The Wright Memorial was nominated for listing in the NRHP in 2010 due to its excellent condition and high level of integrity. Because of routine maintenance and minimal alterations, the site has retained essential features necessary to convey its historic identity. The status of the Wright Memorial as a NRHP site is pending.

Three prehistoric archaeological resources were noted in the ICRMP as being located in proximity to the Wright Memorial project area and include the following:

- Site 33 GR 30, known as the Wright Brothers Memorial Mound Group, is located at the Wright Memorial. This site consists of six mounds and has been listed on the NRHP since the 1974. The USAF acquired this property in 1978 from the MCD. Reports indicate the mounds were explored in the 1920s and 1940s; however, there is not much documentation of these efforts.
- Site 33 GR 797, is a lithic scatter/isolated finds site. Hardlines Design Company (HDC) conducted evaluative testing of this site in 2002 and determined through coring, a visual reconnaissance, and an examination of historical aerial photographs, that this site was not eligible for the NRHP. No further work was planned and the SHPO concurred with HDC's finding.
- Site 33 GR 923, a lithic debitage with no diagnostics or other tools and soil disturbance. Due to the nature of the soils and the redundant cultural information collected, this site was recommended as ineligible for the NRHP.

Site 33 GR 30 is a known prehistoric archaeological site listed on the NRHP. Sites 33 GR 797 and 33 GR 923 are known sites ineligible for the NRHP based on location of heavy human disturbance and lack of cultural materials.

- Six historical archaeological resources were noted in the ICRMP as being located near the Wright Memorial.

These historical archaeological resources are known ineligible sites for the NRHP.

#### ***Riverview Area***

Areas southwest of the runways and a small portion of an area near the Mad River were investigated in 1995 and 1999 (WPAFB 2006a). Two prehistoric archaeological resources were noted in the ICRMP as being located in proximity to the Riverview area and include the following:

- Sites 33 GR 919 and 33 GR 920, revealed little if any prehistoric or historical cultural material during shovel test pit excavations conducted by the ASC Group, Inc. in 1999. These sites were noted as being greatly disturbed by bulldozing and land clearing. Due to the lack of integrity, it was recommended that these sites were ineligible for the NRHP.

One historical archaeological site was noted within the Riverview Area and includes site R8 T2 S2 #8, identified as a disturbed residential-type site, is a known ineligible site.

#### ***Sandhill Area***

A small portion of the Sandhill Area was investigated as part of a 1994 and 2004 survey (WPAFB 2006a). One prehistoric archaeological resource was noted in the ICRMP as being located in the Sandhill Area and included the following:

- Site 33 GR 890 was investigated in 1994 and identified artifacts consisting of a secondary flake and a piece of block shatter. Further testing was recommended to determine whether this site may be potentially eligible for the NRHP. The ASC Group, Inc. undertook an investigation of this site in 2004 and determined that the initial artifacts collected in 1994 could have been glacial chert with edge damage caused by plowing. This site was recommended as ineligible for the NRHP and SHPO concurred.

Based on Section 304 of the NHPA and 36 CFR 800.6(a)(5), precise locations of identified historic and archaeological resources mentioned above are withheld from disclosure in this EA due to the possibility that disclosure may risk harm to the historic resource or may impede the use of a traditional religious site.

As part of the IICEP process, WPAFB initiated consultation with the SHPO. Based on a response from the SHPO in a letter dated July 20, 2011, archaeological and architectural surveys have been conducted as part of the ICRMP. Historic resources determined to be eligible for listing on the NRHP within the APE are the Wright Brothers Memorial Mound Group and the Wright Brothers Memorial Monument, both located within Treatment Site A. The proposed work in this treatment site is limited to pruning less than 20 trees, which would not require the use of heavy equipment that has the potential to disturb

archaeological sites. Based on the information presented, the SHPO concurred that the proposed project will have no adverse effect to historic properties. Correspondence letters are included in **Appendix A**.

### **3.8 Socioeconomics**

#### **3.8.1 Definition of the Resource**

Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators might be accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment could identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region could be used to compare the “before” and “after” effects of any jobs created or lost as a result of a proposed action. Data on industrial or commercial growth or growth in other sectors provides baseline and trend line information about the economic health of a region.

In appropriate cases, data on an installation’s expenditures in the regional economy help to identify the relative importance of an installation in terms of its purchasing power and jobs base. Demographics identify the population levels and changes to population levels of a region. Demographics data might also be obtained to identify, as appropriate to evaluation of a proposed action, its characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

Socioeconomic data are presented at county, state, and U.S. levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends. Data have been collected from previously published documents issued by Federal, state, and local agencies and from state and national databases (e.g., U.S. Bureau of Economic Analysis’ Regional Economic Information System).

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. The EO further requires Federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. The order defines environmental health and safety risks as “risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on, and the products we use or

are exposed to).” Such information aids in evaluating whether a proposed action would render vulnerable children targeted for protection in the EO.

### **3.8.2 Existing Conditions**

#### **Social and Economic Conditions**

**Population** – WPAFB is located 10 miles outside of Dayton, Ohio. The city of Dayton has a population of 166,179; the Dayton-Springfield, Ohio Metropolitan Statistical Area (MSA) has a population of 950,558 (Bureau of Census 2000a). The MSA is defined by the U.S. Census Bureau as a core area with a large population nucleus (at least 50,000) and the adjoining communities that have a high degree of economic and social integration within that core (Bureau of Census 2000b). Note: The 2010 census data had not been finalized when this EA was prepared; therefore, the most recent census data from 2000 were used.

The Dayton-Springfield MSA includes the counties of Greene, Montgomery, Miami, and Clark. For the purposes of this EA, the MSA is considered the region of influence (ROI) around WPAFB (Bureau of Census 2000a).

**Employment** – Some of the key industries in the Dayton, Ohio, economy include services, trade (wholesale and retail), government, and manufacturing. In fiscal year (FY) 06, the finance and insurance industries employed 14,595 employees and jobs provided by the government totaled 37,298 (DACC 2010).

**Table 3-5** lists the industry of employment for residents around WPAFB, the Dayton-Springfield MSA, and the state of Ohio in 2000. A large portion of residents in the Dayton-Springfield MSA are employed in education, health and social services, and public education or manufacturing; a lower percentage are employed in agriculture, forestry, fishing and hunting, and mining.

WPAFB provides a major source of employment in the five-county area. In addition, WPAFB awards numerous contracts every year to local businesses. For FY09, the total number of jobs provided by WPAFB was 27,406 (WPAFB 2009b). This number includes military active duty, trainees and reservists, DoD civilians, and other civilians, such as contractors. The number of indirect jobs supported by the base, such as restaurants, dry cleaners, and others is estimated at 33,090. The total economic impact to the local Dayton community was \$5.1 billion.

**Table 3-5. Employment of Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)**

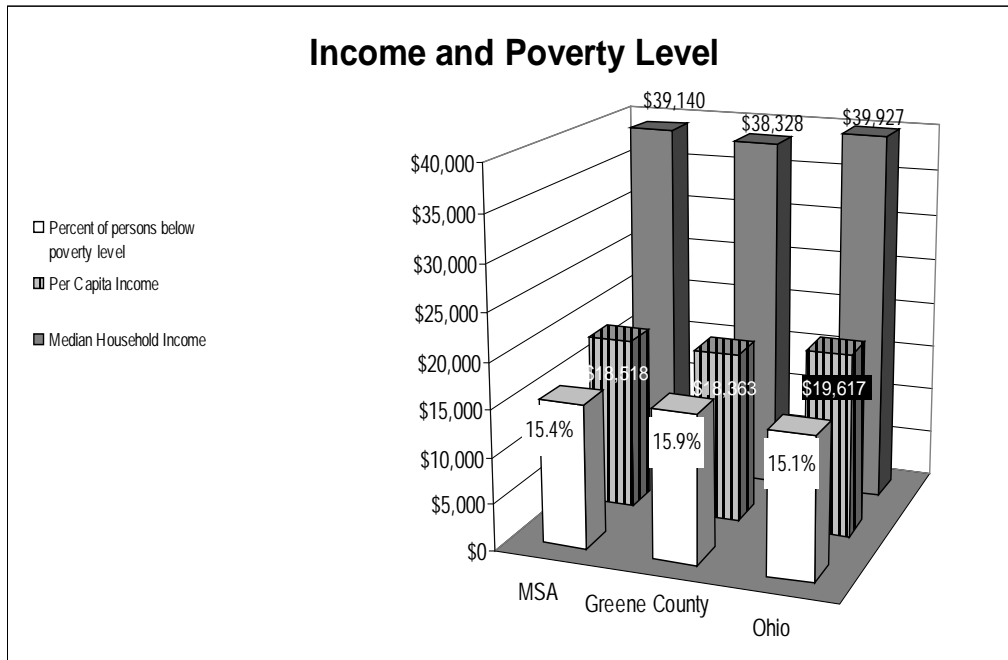
Employment by Industry	Dayton–Springfield MSA	Greene County	State of Ohio
Percent of Employed Persons in Armed Forces	0.7%	2.2%	0.1%
Industry of Civilian Labor Force			
Agriculture, forestry, fishing and hunting, and mining	0.5%	0.7%	1.1%
Construction	5.4%	5.4%	6.0%
Manufacturing	19.1%	13.8%	20.0%
Wholesale trade	3.2%	2.6%	3.6%
Retail trade	12.0%	12.3%	11.9%
Transportation and warehousing, and utilities	4.8%	3.9%	4.9%
Information	2.3%	2.3%	2.4%
Finance, insurance, real estate, and rental and leasing	5.0%	4.5%	6.3%
Professional, scientific, management, administrative, and waste management services	9.0%	9.6%	8.0%
Education, health and social services	20.8%	23.8%	19.7%
Arts, entertainment, recreation, accommodation, and food services	7.5%	7.9%	7.5%
Other services (except public administration)	4.4%	4.2%	4.5%
Public administration	5.9%	8.9%	4.1%

Source: Bureau of Census 2000a  
MSA = Metropolitan Statistical Area

The unemployment rate for the Dayton-Springfield MSA in July 2010 was 11.2 percent, slightly higher than the statewide average of 10.3 percent (DACC 2010). The 2010 unemployment rate in the MSA around WPAFB and within Greene County was 9.6 percent, slightly lower than the state average of 10.2 percent. Residents living in Greene County have a lower per capita income and median household income in comparison to the MSA and the state of Ohio (Bureau of Census 2000a). The residents of Greene County also have a higher percent of persons living below the poverty level (**Figure 3-9**). The difference between the income and poverty levels are not considered to be substantially different from the MSA, countywide, or statewide averages.

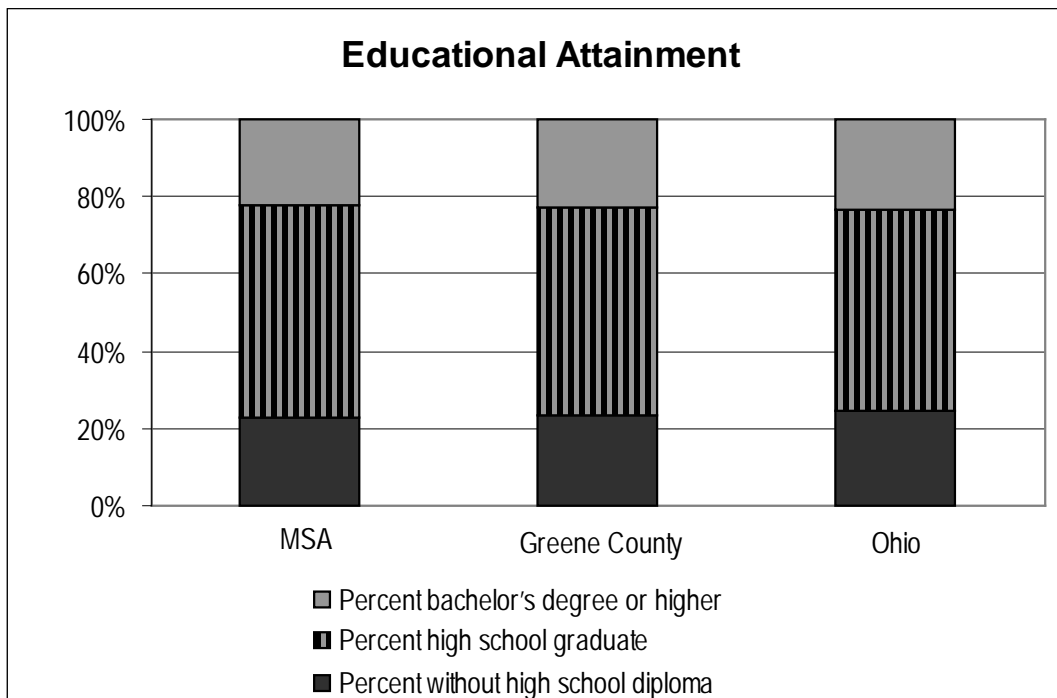
**Education** – The percent of residents who have obtained a high school diploma is substantially the same around WPAFB, countywide, and statewide (**Figure 3-10**). However, a smaller percentage of residents in the MSA achieved a college education (22.4 percent) in comparison to Greene County (22.7 percent) and statewide (23.2 percent) percentages.

**Figure 3-9. Income and Poverty Level of Residents in Dayton–Springfield MSA, Greene County, and the State of Ohio (2000)**



MSA=metropolitan statistical area

**Figure 3-10. Educational Attainment of the Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)**



MSA=metropolitan statistical area

### **3.9 Environmental Justice**

#### **3.9.1 Definition of the Resource**

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that all federal agencies address the effects of policies on minorities and low-income populations and communities, and to ensure that there would be no disproportionately high and adverse human health or environmental effects to minority or low-income populations or communities in the area. A “minority” is defined as a person who is Black, Hispanic (regardless of race), Asian American, American Indian, and/or Alaskan Native. “Low-income” is defined as a household income at or below the U.S. Census Bureau Poverty Threshold (Bureau of Census 2010).

A minority population is defined as any readily identifiable group of minority persons who live in geographic proximity, or are geographically dispersed or transient persons (such as migrant workers) who will be similarly affected by a proposed program, policy, or action (Bureau of Census 2010). Minority populations residing in the study area were compared to the population characteristics of the city and state. The CEQ guidance states that “minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.”

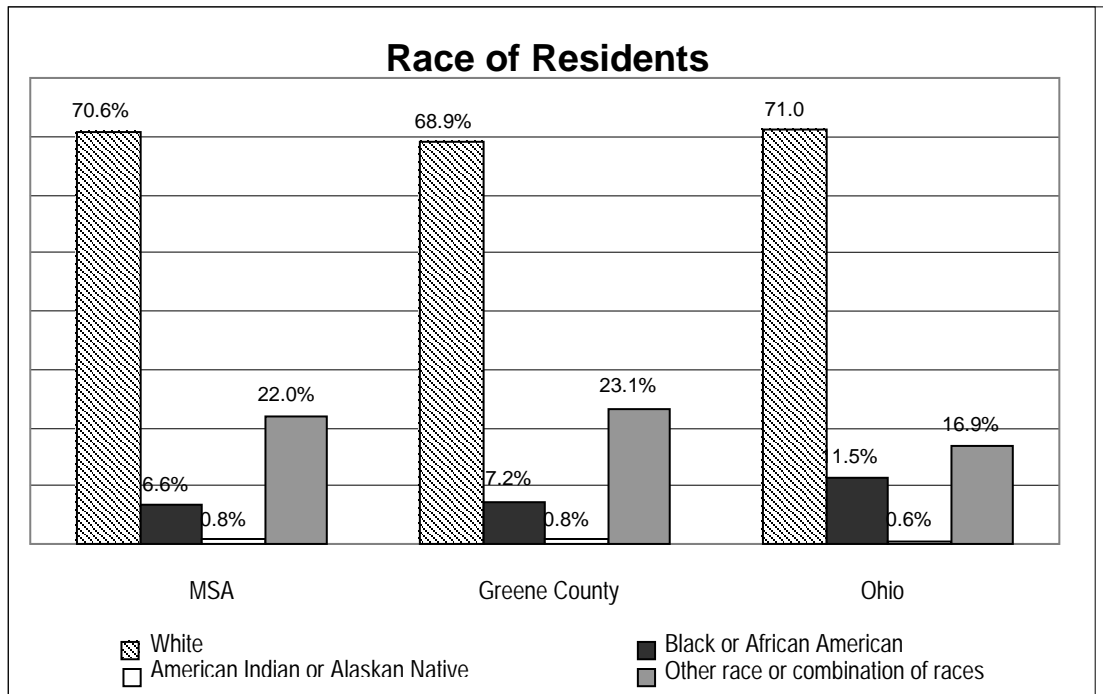
Low-income status was based upon comparing the income of the proposed project site and larger study area residential population to the U.S. Census Bureau Poverty Threshold (U.S. Census Bureau, Housing and Household Economic Statistics Division 2000a). The CEQ guidelines do not specifically state the percentage considered meaningful in the case of low-income populations. The definition of “low income populations” is defined by HUD as populations where “50 percent or greater are low-income individuals”.

#### **3.9.2 Existing Conditions**

A screening analysis using U.S. Census Bureau racial and economic information catalogued by Census Tract and Block Group for 2000 was used to identify low income and minority populations living within the MSA around WPAFB. For the purpose of this analysis, residents living within Census Bureau Tract 2001.02 and 2007 are further evaluated to determine if a disproportionate level of impact could occur.

Census Bureau Tract 2001.02, which is northwest of WPAFB, was found to have a somewhat higher portion of minority populations (25 percent) than adjoining areas (average of 15 percent) (**Figure 3-11**). Census Bureau Tract 2007, which is located southeast of the Base, has a minority population that is relatively equal to surrounding areas (Bureau of Census 2000a).

**Figure 3-11. Race of Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)**



Residents of Census Bureau Tract 2001.02 were also found to have a lower per capita income (\$13,339), a higher unemployment rate (9.4 percent), a higher portion of residents living below the poverty level (38.5 percent), and a higher population growth rate between 1990 and 2000 (31 percent) in comparison with residents in adjoining areas (Bureau of Census 1990 2000a). Residents of Census Bureau Tract 2007 were also found to have a lower per capita income (\$13,295), a slightly higher unemployment rate (3.6 percent), a higher portion of residents living below the poverty level (23.3 percent), and a higher population growth rate between 1990 and 2000 (24 percent) in comparison to residents in adjoining areas (Bureau of Census 1990, 2000a).

### 3.10 Infrastructure

#### 3.10.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area.

The infrastructure components to be discussed in this section include transportation systems, utilities (electrical power, natural gas, liquid fuel, and water supply), pollution prevention, solid waste, sanitary and wastewater systems, heating and cooling, communications, and airfield pavement.

Solid waste management primarily concerns itself with the availability of landfills to support a population's residential, commercial, and industrial needs. Alternative means of waste disposal might involve waste-to-energy programs or incineration. In some localities, landfills are designed specifically for, and are limited to, disposal of construction and demolition debris. Recycling programs for various waste categories (e.g., glass, metals, and papers) reduce reliance on landfills for disposal.

### **3.10.2 Existing Conditions**

The infrastructure information contained in this section was obtained from the WPAFB General Plan (WPAFB 2001) and provides a brief overview of each infrastructure component and comments on its existing general condition.

#### **Transportation System**

State highways provide direct access to WPAFB. SR-444 bisects the Base creating a barrier between Wright Field and Patterson Field (WPAFB 2001). SR-844 provides a route from Gate 15A to I-675, which is located east of the Base. I-675 provides direct access to I-70, which is approximately 9 miles to the north; U.S. 35, which is approximately 5 miles to the south; and I-75, which is approximately 15 miles to the southwest (WPAFB 2001). SR-235 provides access from Gate 26A to SR-4 and I-70 (WPAFB 2001). Traffic enters Area B through Gates 1B from Springfield Street, 19B from National Road, and 22B off of Interstate 675.

#### **Electrical Power**

Dayton Power & Light provides WPAFB with electrical power (WPAFB 2001). The Base receives power via two substations, which is delivered by over 500 miles of primary electrical lines on Base. These aboveground and underground transmission lines are owned by WPAFB (WPAFB 2001).

The electrical distribution system on Base is designed to meet the needs of a much larger base population so the demands of service are within the system's capacity (WPAFB 2001). The overall condition of the system is adequate in providing the power to the current Base population.

**Natural Gas.** The natural gas at WPAFB is supplied by Vectren. The on-Base natural gas system, which is owned by WPAFB, contains over 130,000 linear ft of underground piping and 11 distribution subsystems (WPAFB 2001). Vectren owns a distribution line that goes past the Wright Memorial area. The natural gas system is the principal heating option for housing areas and outlying areas of the Base. It feeds some individual buildings and the three satellite heating plants: Buildings 20581, 10849, and 4019 (WPAFB 2001).

**Liquid Fuel.** The liquid fuel system at WPAFB is delivered primarily by tank trucks with an alternate capability for pipeline delivery. Defense Logistics Agency-Energy is responsible for determining mode

of delivery. WPAFB operates approximately 85 underground storage tanks (USTs) and 175 aboveground storage tanks (ASTs).

Eighty percent of the storage capacity on Base is for Jet Fuel-8 (JP-8), which is supplied directly to the Base via tank truck from Defense Fuel Support Point – Lebanon. The Bulk Fuels Storage tank farm is comprised of ten 420,000-gallon JP-8 ASTs and one 840,000-gallon JP-8 AST, one 15,000-gallon motor gas AST, and one 220,000-gallon diesel AST. The tank farm is located near Building 30154 on Patterson Field and is located within the north end of the southern transitional area.

**Water Supply.** The water supply and distribution system at WPAFB consists of two Base-owned and operated water collection, treatment, storage, and distribution systems (WPAFB 2001). One system services Wright Field (Area B) and The Woods (formerly referred to as Woodland Hills). The second system services Area A and Patterson Field. The only portion of the Base that does not use the WPAFB water distribution system is the Page Manor housing area. Page Manor receives water from the Montgomery County Sanitary Sewer District (WPAFB 2001). WPAFB utilizes approximately 3.2 million gallons of drinking water per day.

**Pollution Prevention.** AFI 32-7080, *Pollution Prevention Program*, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*; EO 12873, *Federal Acquisition, Recycling, and Waste Prevention*; and EO 12902, *Energy Efficiency and Water Conservation at Federal Facilities*. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans. The 88 ABW fulfills this requirement with the following plans (WPAFB 2001):

- Integrated Solid Waste Management Plan
- Storm Water Pollution Prevention Plan
- Hazardous Waste Management Plan
- Hazardous Material Emergency Planning and Response Plan
- The Spill Prevention Control and Countermeasure Plan

These plans ensure that WPAFB maintains a waste reduction program and meets the requirements of the CWA; NPDES permit program; and Federal, state, and local requirements for spill prevention control and countermeasures.

**Solid Waste.** Municipal solid waste at WPAFB is managed in accordance with the guidelines specified in AFI 32-7042, *Solid and Hazardous Waste Compliance*. This AFI incorporates by reference the requirements of Subtitle D, 40 CFR 240 through 244, 257, and 258, and other applicable Federal regulations, AFIs, and DoD Directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste

management plan; procedures for handling, storage, collection, and disposal of solid waste; record-keeping and reporting; and pollution prevention.

WPAFB operates a Qualified Recycling Program that is run by 88 ABW/Asset Management Division of the Environmental Branch (CEANP). The recycling center is located in Building 10293 on Patterson Field. The recycling program includes aluminum, glass, paper, plastics, cardboard, oil, and ferrous and nonferrous materials (WPAFB 2001).

WPAFB has a contract for solid waste pick-up and disposal of all refuse on the base (WPAFB 2001). The contractor removes refuse from military family housing and industrial areas on the Base.

**Sanitary Sewer and Wastewater Systems.** The sanitary sewer collection system at WPAFB is owned by the Base and consists of 43 miles of pipelines. The wastewater produced on the north side of Patterson Field is discharged to the Fairborn treatment plant, northwest of the Base. The wastewater produced on the remainder of Patterson Field, Wright Field, and Page Manor is served by the Dayton treatment system.

WPAFB produces an average of 3.5 million gallons per day (gpd) of sewage. The overall condition of the system is adequate in the collection of wastewater. The current system is designed to accommodate a Base population that is approximately 50 percent larger (WPAFB 2001).

**Heating and Cooling.** WPAFB is heated with six coal- and gas-fired central heating plants. These plants are located throughout the Base and provide approximately 80 percent of the annual heating requirements for WPAFB (WPAFB 2001). The two largest central heating plants are in Building 31240, which serves Patterson Field and Kittyhawk Community Center; and Building 20770, which serves Wright Field (WPAFB 2001). There are also four satellite heating plants that serve smaller areas on the Base. These plants operate on natural gas and provide 4 percent of the Base's overall heating needs. The remaining 16 percent of the Base's overall heating is met by natural gas furnaces in individual buildings (WPAFB 2001).

**Communications.** The communications system at WPAFB provides support to the 445 Air Wing (AW) and its associate units. The communications system consists of telephone, local computer systems, long-haul communications, and land mobile radio systems (WPAFB 2001). There are over 100 miles of communication cable ducts on Base (WPAFB 2001).

WPAFB's communications and information utility infrastructure is in good condition (WPAFB 2001). There are improvements planned for the Base that would enable it to meet any known future communication requirements (WPAFB 2001).

### **3.11 Health and Safety**

#### **3.11.1 Definition of the Resource**

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The public has little access to the construction activities associated with the Proposed Action.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of highly noisy environs. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation processes creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

#### **Munitions and Explosive Safety**

Explosive safety zones (ESZs) are required for areas where ordinance are stored or handled. ESZs are typically determined based upon the net explosive weight of the ordinance to be stored or handled and the blast resistance properties of the magazine. Explosive Safety Quantity Distance (ESQD) arcs that delineate the extents of each ESZ are constructed. ESZ and ESQD requirements are specified in AFMAN 91-201, *Explosive Safety Standards*.

#### **Construction and Demolition Safety**

Construction site safety is largely adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by DoD and USAF regulations designed to comply with standards issued by Occupational Safety and Health Administration (OSHA) and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

#### **3.11.2 Existing Conditions**

##### **Fire Hazards and Public Safety**

The Fire Department at WPAFB provides fire, crash, rescue, and structural fire protection at the Base. The 445 AW abides by a general safety policy relating to the performance of all activities at the Base. Individuals, supervisors, managers, and commanders are expected to give full support to safety efforts and safety awareness and strict compliance with established safety standards are expected.

### **Munitions and Explosives Safety**

There are several areas that are constrained by ESQD CZs (operational constraints near missile related activities) in the Patterson Field area (WPAFB 2001). The weapons storage area near the West Ramp (adjacent to Bass Lake) provides space for conventional munitions maintenance and storage. The ESQD CZ for two storage structures is 1,255 ft and 1,468 ft. Hot cargo pads provide space for loading and unloading of cargo aircraft that are transporting munitions. The normal day-to-day CZs are 1,250 ft. Larger CZs are used when required for emergency operations. Locations I-1 and I-2 on the India ramp (located within the southern transitional area) are sited for Hazard Class/Division 1.4 explosives storage. Explosives are classified based on their reactions to specific influences. The explosives hazard class is further subdivided into “division”, based on the character and predominance of the associated hazards and their potential for causing personnel casualties or property damage. Explosives Hazard Class/Division 1.4 designates a moderate fire with no significant blast or fragment hazard (Sandia 2010).

The southernmost hot cargo pad is used on a regular basis for hot cargo operations. Eleven contingency hot cargo pads are provided along Taxiway A. These pads require a 1,250-ft ESQD CZ (WPAFB 2001). There are no ESQDs on the west parking apron. An arm/de-arm and hung ordnance pad is provided at both ends of Taxiway B.

There are two areas that are constrained by ESQD CZs in Area B (WPAFB 2011b). CZs exist at Wright Field and at Building 20100 (Aerospace Survivability Facility).

### **Construction and Demolition Safety**

All contractors performing construction activities are responsible for following ground safety regulations and worker compensation programs, and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable.

Contractor responsibilities are to review potentially hazardous workplace operations; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous materials), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures.

## **3.12 Hazardous Materials and Wastes / Environmental Restoration Program Sites**

### **3.12.1 Definition of the Resource**

AFPD 32-70, *Environmental Quality*, establishes the policy that the USAF is committed to

- Cleaning up environmental damage resulting from its past activities

- Meeting all environmental standards applicable to its present operations
- Planning its future activities to minimize environmental impacts
- Managing responsibly the irreplaceable natural and cultural resources it holds in public trust
- Eliminating pollution from its activities wherever possible

Hazardous material is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. Hazardous waste is defined as any solid, liquid, contained gaseous, or semi-solid waste; or any combination of wastes that pose a substantial present or potential hazard to human health or the environment.

Evaluation of hazardous materials and wastes focuses on USTs and ASTs and the storage, transport, and use of pesticides and herbicides, fuels, and petroleum, oils, and lubricants (POL). Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of hazardous materials or wastes, the extent of contamination varies based on type of soil, topography, and water resources.

Special hazards are those substances that might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), radon, lead-based paint (LBP), polychlorinated biphenyls (PCBs), and unexploded ordnance. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and the Toxic Substances Control Act (TSCA), defines hazardous materials. The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Through its Environmental Restoration Program (ERP), the DoD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, to control the migration of contaminants, to minimize potential hazards to human health and the environment, and to clean up contamination.

Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

### **3.12.2 Existing Conditions**

#### **Hazardous Materials**

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. A privately contracted hazardous material pharmacy (HAZMART) is located in Building 30089. The HAZMART ensures that only the smallest quantities of hazardous materials necessary to accomplish the mission are purchased and used (WPAFB 2001).

Hazardous and toxic material procurements at WPAFB are approved and tracked by the Bioenvironmental Engineering Office. The Asset Management Division supports and monitors environmental permits, hazardous material and hazardous waste storage, spill prevention and response, and participation on the Base Environmental Protection Committee. The Hazardous Substance Steering Committee is a network safety, environmental and logistics experts who work with hazardous material Issue Point Managers, Unit Environmental Coordinators (UECs), and other hazardous material users to ensure safe and compliant hazardous material management throughout the base (WPAFB 2008a).

#### **Hazardous Waste**

The 88 ABW maintains a Hazardous Waste Management Plan (WPAFB 2008b) as directed by AFI 32-7042, *Solid and Hazardous Waste Compliance*. This plan prescribes the roles and responsibilities of all members of WPAFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous waste management.

Wastes generated at WPAFB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, mixed-solid waste (MSW), and other miscellaneous wastes. Management of hazardous waste is the responsibility of each waste-generating organization and the Asset Management Division (88 ABW/CEA). WPAFB produces more than 1,000 kilograms of hazardous waste per month and is considered a large quantity hazardous waste generator.

### **Stored Fuels**

Stored fuels present a potential threat to the environment, which is mitigated at WPAFB through spill prevention and control and countermeasures (SPCC). The WPAFB SPCC Plan (WPAFB 2008c) describes practices used to minimize the potential for stored fuel spills, prevent spilled materials from migrating off the base, and ensure that the cause of any spill is corrected. The WPAFB Oil and Hazardous Substance Integrated Contingency Plan (WPAFB 2005) describes emergency planning, notification and spill response practices. Collectively, the SPCC Plan, with a focus on spill prevention, and the Integrated Contingency Plan (ICP), with a focus on spill response, provides a comprehensive strategy for preventing stored fuel releases to the environment.

The Spill Prevention Coordinator (SPC) is the primary point of contact for the SPCC Program. The SPC works closely with Tank Managers, UECs, and WPAFB emergency response personnel to implement the SPCC Plan. Required SPCC training, standard operating procedures (SOPs), inspections, and record keeping are coordinated by the SPC.

### **Asbestos-Containing Materials**

AFI 32-1052, *Facilities Asbestos Management*, provides the direction for asbestos management at USAF installations. This instruction incorporates by reference applicable requirements of 29 CFR 669 et seq. 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable AFIs and DoD Directives.

AFI 32-1052 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos-management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. 669, et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

The 88 ABW/CEA has developed standard contract specifications for the removal and disposal of ACM. These specifications incorporate all applicable USEPA, OSHA, and USDOT requirements. The Ohio Department of Health (ODH) must license contractors, and all asbestos-abatement work must be done under the onsite supervision of an ODH-designated “competent person.” Work area monitoring for airborne asbestos fibers is accomplished by an industrial hygienist certified by the American Board of Industrial Hygiene. Industrial hygienists must also be certified by the ODH. Laboratory analyses of air samples and of bulk samples must be accomplished in a certified and accredited laboratory.

Non-friable ACM can be disposed of in a sanitary landfill. Friable asbestos must be disposed of in a USEPA-approved landfill. ACM-abatement contractors are responsible for obtaining all required permits

from regulatory agencies and for OEPA and ODH notification requirements (WPAFB 2001). WPAFB has implemented an Asbestos Management Plan to minimize risk from friable ACM in buildings where the material remains. Additional sampling is usually required in buildings scheduled for renovation or demolition (WPAFB 2001).

There are no structures located within any of the treatment sites in the Riverview or Sandhill areas. A visitor's center is located in proximity to the Wright Memorial, however, this structure was constructed more recently, no renovation or demolition is proposed, and ACM would not be a concern.

### **Lead-Based Paint**

The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X), passed by Congress on October 28, 1992, regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards.

USAF policy and guidance establishes LBP management at USAF facilities. The policy incorporates, by reference, the requirements of 29 CFR 1910.120, 29 CFR 1926, 40 CFR 50.12, 40 CFR 240 through 280, the CAA, and other applicable Federal regulations. Additionally, the policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating LBP hazards.

More than 95 percent of WPAFB facilities were constructed prior to 1980 and contain LBP. Lead concentrations are generally low with the exception of paints used on outdoor structures such as water towers. The HUD action level is 5,000 ppm. However, even when concentrations are below this, OSHA Lead Construction Standard (29 CFR 1926.62) must be followed. All workers performing lead abatement or removal or any other lead disturbance are required to have a lead workers license issued by the ODH. Licensing is not required if the contract involves mechanical demolition. Contractors containerize LBP wastes which are disposed of under contract. Bioenvironmental engineering samples and monitors all in-house projects involving LBP (WPAFB 2001).

There are no structures located within any of the treatment sites in the Riverview or Sandhill areas. A visitor's center is located in proximity to the Wright Memorial, however, this structure was constructed more recently, no renovation or demolition is proposed, and LBP would not be a concern.

### **Environmental Restoration Program**

The ERP is a subcomponent of the Defense Environmental Restoration Program that became law under SARA (formerly the Installation Restoration Program [IRP]). The ERP requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. WPAFB began its IRP in 1981 with the investigation of possible locations of hazardous waste contamination. In 1988, WPAFB

entered into an Ohio Consent Order with the OEPA. In October 1989, WPAFB was placed on the USEPA's National Priorities List, a list of sites that are considered to be of special interest under CERCLA and require immediate attention (WPAFB 2001).

WPAFB currently has identified 67 ERP sites, two regional groundwater sites, and several areas of concern per the Air Force Restoration Information Management System. WPAFB has grouped the majority of confirmed or suspected sites requiring investigation and characterization into 11 geographically-based operable units (OUs), designated as OUs 1 through 11 (IT 1999). In addition to the 11 OUs, WPAFB addressed base-wide issues of groundwater and surface water contamination under the Groundwater Operable Unit (GWOU), which is managed through the Basewide Monitoring Program (BMP) and Long-Term Groundwater Monitoring (LTM) Program. Principal groundwater contaminants beneath WPAFB include benzene, toluene, ethylbenzene, xylene; trichloroethene; tetrachloroethene; and vinyl chloride (WPAFB 2007c).

### ***Wright Memorial Area***

Treatment Site A at Wright Memorial is not located within or adjacent to any OU.

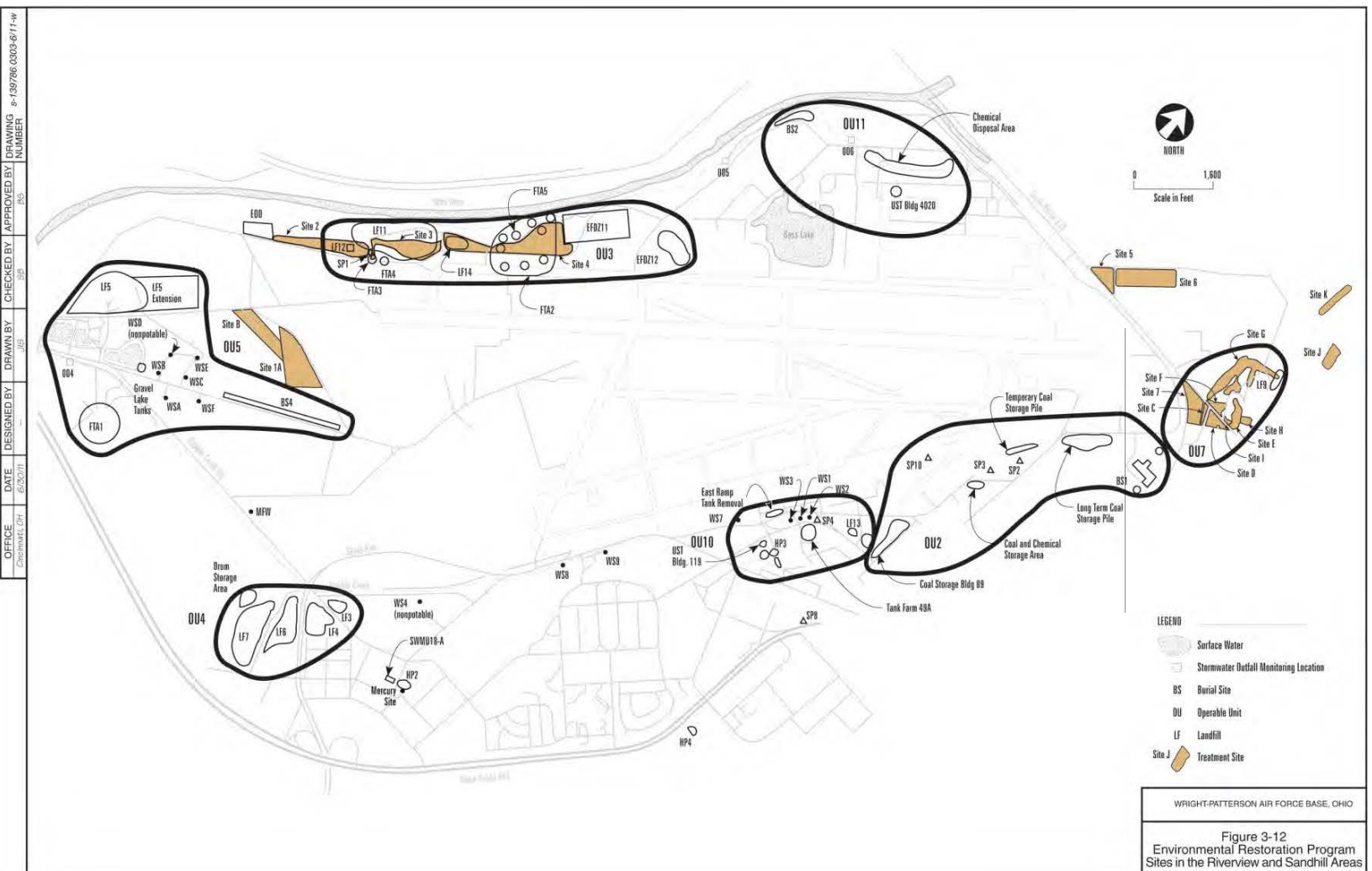
### ***Riverview Area***

Several Treatment Sites in the Riverview area are located within OU3 and are adjacent to OU5. Treatment Sites 2, 3, and 4 are located within OU3. Treatment Sites 1A and B are located adjacent and east of OU5. **Figure 3-12** presents the locations of OU3 and OU5.

OU3 consists of 10 ERP sites that include three landfills (LF11, LF12, and LF14), four Fire Training Areas (FTAs 2, 3, 4, and 5), one spill site (SS 1), and two former Earthfill Disposal Zones (EFDZs 11 and 12). Treatment Site 2 is located over LF12 and Treatment Site 4 is located over LF14 and portions of FTA2. Treatment Site 3 is adjacent to LF11, FTAs 3 and 4, and SS1.

A Remedial Investigation (RI) was conducted for OU3 and completed in 1994 (SAIC 1994). The RI report provides a description of each ERP and activities conducted during the investigation. As part of the RI, soil samples were collected from each of ERP site in OU3 to determine the presence of chemical contamination. A risk assessment was conducted for each of ERP site to determine potential risk to human health. The risk assessments concluded there was only minimal risk from exposure to soil at most of the sites, including LF14 and FTA 2. Based on the RI and a Management Action Plan Update (WPAFB 2007d), no further action (i.e., no cleanup of the site) was recommended in the Record of Decision (ROD) for all of the sites (WPAFB 1996, 2007d).

Conclusions from the RI stated that LF11 and LF12 pose a risk to human health under current and potential future conditions (potential future conditions allow for the possibility that OU3 is developed for commercial/industrial purposes and/or recreational purposes). Primary chemicals contributing to risk



include beryllium, benzo(a)pyrene, dibenzo (a,h)anthracene, and 2,3,7,8- tetrachlorodibenzodioxin (TCDD).

A recommendation was made for the closure of LF11 (i.e., capping) and excavation and disposal of material contained in LF12. Field work at LF11 was completed in June 1997 and consisted of surface debris removal, installation of a native soil and vegetation cover, installation of surface water run-on/run-off controls, and implementation of institutional controls (WPAFB 1998a). The activities for the removal of material in LF12 began in September 1997 and were completed in April 1998. The removal action at LF12 consisted of the excavation and disposal of 2,000 buried containers, including 32 compressed gas cylinders (IT 1998b).

Although the LF14 area was thought to have been used as a construction rubble and earthfill site, subsequent investigations demonstrated that this area was not a landfill. The “landfill” designation, however, is used in the ROD. FTA2 was one of several small, covered gravel pits that were used to conduct fire-training exercises from the mid-1950s to the early 1980s (WPAFB 1996). OU5 consists of four ERP sites that include one landfill (LF5 and the LF5 extension), FTA1, the Gravel Lake Tanks Site (GLTS), and Burial Site 4 (BS4). Treatment Sites 1A and B are not located physically on any of the ERP sites within OU5 (**Figure 3-12**).

In summary, an RI of OU5 began in 1993 and was completed in late 1995. The RI was undertaken to characterize the extent of environmental contamination, to assess risks to human health and the environment, and to develop, evaluate, and select appropriate remedial actions to mitigate adverse health effects, if required. Because LF5 was capped as a presumptive remedy, residual human health risk from OU5 soil exposures is below the target risk range. Groundwater in the vicinity of LF15 and the western Base boundary contains nine chemicals at levels above Preliminary Remediation Goals. Groundwater at LF15 and the western Base boundary is captured by extraction well EW-1 and remediated by the Groundwater Treatment System (GWTS). The discharge from the GWTS goes to West Twin Lake and is monitored in accordance with the NPDES permit. Because sampling data did not indicate a significant risk or threat to public health or the environment, no further action was taken at FTA1, GLTS, and BS4 (WPAFB 1996). Specifically, risk to human health and the environment associated with surface soil exposure and transport of contaminants by wind and surface water runoff were eliminated.

Institutional controls for OU3 and OU5 (including the landfills) are based on the limited access to the sites because they are located on an active military installation (WPAFB 1996). Digging/excavation at any of these sites, especially those with waste/contamination left in place is currently restricted by the nature of the installation and should remain minimal. To achieve the performance objectives stated above, the following land use controls (LUCs) will be implemented by the WPAFB Civil Engineering, Asset Management Division, Natural Resources Management Branch (CEAN) personnel:

- A base construction review process to avoid ground-disturbing construction activities on a site designated with LUC or to ensure safe soil and groundwater management procedures in areas with residual soil or groundwater contamination. Construction and other soil disturbances allowable after approval by CEAN personnel; area subject to use restriction.
- The base Environmental Impact Analysis Process (EIAP), implemented by CEAN, to assess the potential environmental impact of any action proposed at the site.

In addition, maintenance of the landfill cap at LF11 is conducted as described in the Operation and Maintenance Plan for LF11 (WPAFB 1998b). Based on the Management Action Plan Update, no further action has been recommended in the ROD for all sites within OU5.

The environmental decision documents for ERP sites at WPAFB have identified land use controls that support the RI or no further action decisions. The land use controls or restrictions required at many of the sites at WPAFB (such as fencing an area) were established to either minimize human exposure to possible contaminants or protect the integrity of the remedial action. A Land Use Control Plan was prepared in 2006 which specifies components that must be incorporated into future land use activities with regard to ERP sites (WPAFB 2006b).

### ***Sandhill Area***

Treatment Sites C, D, E, F, G, H, I, and 7 are located within OU7. OU7 is comprised of a single landfill, LF9, and Pits A and B. Treatment Site D is located over a portion of Pit B, while Treatment Sites E, H, and I are located over Pit A (**Figure 3-12**). A small portion of Treatment Site G is located over LF9 (or Pit C) and Pit A. Treatment Sites C, F, and 7 are located within the boundary of OU7 but are not physically located over Pits A, B, or C. After initial environmental investigations, Pits A and B were eliminated from further study when landfill debris was not found. Investigations at LF9 continued. An overview of the environmental investigations at OU7 can be found in the *Final Environmental Assessment for the Combat Vehicle Training Course* (USAF 2000).

LF9 (Pit C) was thought to have operated between 1962 and 1964, receiving waste (including hazardous waste) from all areas of the base. It is believed that the landfill was constructed and maintained as a trench and cover operation, with trenches approximately 20 feet deep and aligned in a north-south direction (SAIC 1995). Conclusions from the OU7 RI stated that although no adverse human health or ecological effects are currently expected from exposure to chemicals from LF 9, the physical condition of the landfill (i.e., thin soil layer and sparse vegetation) justified further action (ICI 1996). According to the ROD for OU7, implementation of capping as a presumptive remedy at LF9 was selected as the final action for the landfill (WPAFB 1998b). Eighteen inches of common soil and six inches of topsoil were placed over the existing landfill, and the area was graded and seeded; specific measures to manage landfill gas and leachate were not required.

The ROD for LF9 addresses access restrictions and institutional controls (WPAFB 1998b). Access to LF9 is limited because it is located on an active military installation. In addition, LF9 is fenced and is heavily vegetated. In accordance with institutional controls, digging and/or excavating at these sites, especially those with waste/contamination left in place (such as the landfills), is currently restricted by nature of the installation and should remain minimal. In addition, maintenance of the landfill cap at LF9 is conducted as described in the Operation and Maintenance Plan for LF11 (WPAFB 1998b). In addition, the EIAP is to be used to screen proposed projects to prevent excavation activities at ERP sites. According to the Management Action Plan Update, no further action has been recommended in the ROD for LF9 (WPAFB 2007d).

Based on the Final Land Use Control Plan prepared in 2006 for OUs at WPAFB (WPAFB 2006), the following lists current land use and allowable future land uses for each ERP site located within or adjacent to treatment sites:

- LF9 – No digging, building, construction, etc. or otherwise disturbing landfill covers.  
LF11 - No digging, building, construction, etc. or otherwise disturbing landfill covers.
- LF12 – Digging, construction and other soil disturbances allowable after approval by CE and Environmental Management Division personnel; area subject to use restriction.
- LF14 - No digging, building, construction, etc. or otherwise disturbing landfill covers.
- FTA2 - No digging, building, construction, etc. or otherwise disturbing landfill covers.
- FTA3 - No digging, building, construction, etc. or otherwise disturbing landfill covers.
- SP1 - No digging, building, construction, etc. or otherwise disturbing landfill covers.

Any proposed tree trimming/pruning in the area of above mentioned ERP sites must be coordinated with the 88 ABW/CEA Environmental Quality Section (CEANQ).

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## 4.0 ENVIRONMENTAL CONSEQUENCES

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This section presents an evaluation of the environmental impacts that might result from implementing the Proposed Action, Alternative B, or the No Action Alternative. The section also includes an analysis of the potential cumulative impacts on WPAFB; unavoidable adverse impacts; the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; and irreversible and irretrievable commitments of resources.

The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; Federal, state, or local agency guidelines and requirement; and/or legislative criteria. Proposed mitigation measures are included for each environmental issue, as appropriate, to reduce potential impacts.

Impacts may be direct or indirect and are described in terms of type, context, duration, and intensity, which is consistent with the CEQ regulations. “Direct effects” are caused by an action and occur at the same time and place as the action. “Indirect effects” are caused by the action and occur later in time or are farther removed from the place of impact, but are reasonably foreseeable.

Impacts are defined in general terms and are qualified as adverse or beneficial, and as short-term or long-term. For the purposes of this EA, short-term impacts are generally considered those impacts that would have temporary effects. For example, air quality impacts from debris associated with trimming/pruning would be considered short-term as they would only last for the duration of the trimming/pruning activities. Long-term impacts are generally considered those impacts that would result in permanent effects. For example, the loss of vegetation associated with eradication of vegetation would be considered long-term.

The thresholds of change for the intensity of impacts are defined as follows:

- *Negligible*, the impact is localized and not measureable or at the lowest level of detection;
- *Minor*, the impact is localized and slight but detectable;
- *Moderate*, the impact is readily apparent and appreciable; or
- *Major*, the impact is severely adverse or highly noticeable and considered to be significant.

### 4.1 Land Use

#### 4.1.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be adverse if it met the following criteria:

- Inconsistency or noncompliance with existing land use plans or policies
- Precluded the viability of existing land use

- Precluded continued use or occupation of an area
- Incompatibility with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property

#### **4.1.2 Proposed Action**

There would be no adverse effects on the land use in any of the three areas (Wright Memorial, Riverview, or Sandhill). All trimming/pruning activities would be limited to areas located on the Base.

Proposed trimming/pruning activities would not result in any adverse or incompatible land use changes on or off the Base nor would they alter the relationships of the general land use areas that have been designated in the base-planning guidance documents. The land use categories incorporate developed and undeveloped lands. These land use designations were established to segregate aircraft facilities from other military base support areas. Proposed trimming/pruning activities would not be in conflict with base land use policies or objectives. The Proposed Action would not conflict with any applicable off-Base land use ordinances or designated CZs.

Effects associated with removal of trees and vegetation would include short-term minor disruption of land uses due to elevated noise levels and potential interference with roadway access due to wood chipping equipment. No changes to land use would occur at WPAFB as a result of the Proposed Action. The noise contour analysis is presented in Section 4.3.

#### **4.1.3 Alternative B**

Similar to the Proposed Action, land use in each of the three areas would not change. Therefore, this Alternative would have no adverse impact on land use over current conditions.

#### **4.1.4 No Action**

The No Action alternative would have no impact on land use over current conditions.

### **4.2 Air Quality**

#### **4.2.1 Evaluation Criteria**

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. For the purposes of this EA, the impact in NAAQS “attainment” areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP

As mentioned in Section 3.3, the area including WPAFB is classified as a moderate maintenance area for O<sub>3</sub>, designated as moderate nonattainment for PM<sub>2.5</sub>, and is designated as an unclassified/attainment area for all other criteria pollutants.

Impacts on air quality in NAAQS “nonattainment” areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP

Because WPAFB is located in an area designated as maintenance for O<sub>3</sub> and non-attainment for PM<sub>2.5</sub>, a conformity applicability analysis is required to determine whether the Proposed Action is subject to the Conformity Rule. With respect to the General Conformity Rule, effects on air quality would be considered significant and, therefore, subject to an evaluation to determine compliance with the General Conformity Rule, if:

- The proposed Federal action does not relate to transportation plans, programs, and projects developed, funded, or approved under Title 23 U.S.C. or the Federal Transit Act, and
- The Proposed Action-related direct and indirect emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been re-designated as a maintenance area.

The *de minimis* threshold emission rates were established by the USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to have “significant” air quality impacts. **Table 4-1** presents these thresholds, by regulated pollutant. These *de minimis* thresholds are similar, in most cases, to the definitions for major stationary sources of criteria and precursors to criteria pollutants under the CAA’s NSR Program (CAA Title I). As shown in **Table 4-1**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

In addition to the *de minimis* emission thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Federal Class I area (e.g., wilderness area greater than 5,000 acres or national park greater than 6,000 acres) and emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 µg/m<sup>3</sup> or more [40 CFR 52.21(b) (23) (iii)]. Although PSD rules apply only to stationary sources of emissions, for the purposes of this EA, such an impact to a Class I area would be considered adverse.

**Table 4-1. Conformity *de minimis* Emission Thresholds**

Pollutant	Status	Classification	<i>de minimis</i> Limit (tpy)
Ozone (measured as NO <sub>x</sub> or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO <sub>x</sub> )
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO <sub>x</sub> )
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/maintenance	All	100
Particulate Matter (PM <sub>10</sub> )	Nonattainment/maintenance	Serious	70
		Moderate	100
		Not applicable	100
Particulate Matter (PM <sub>2.5</sub> )	Nonattainment/maintenance	Direct Emissions	100
		SO <sub>2</sub> precursors	100
		NO <sub>x</sub> precursors	100
Sulfur Dioxide (SO <sub>2</sub> )	Nonattainment/maintenance	Not applicable	100
Nitrogen Oxides (NO <sub>x</sub> )	Nonattainment/maintenance	Not applicable	100

Source: 40 CFR 93.153 (b)

tpy: tons per year

#### 4.2.2 Proposed Action

##### *Air Quality Regulations Applicable to the Proposed Action*

**Stationary Sources and New Source Review.** Local and regional pollutant impacts resulting from direct and indirect emissions from stationary emission sources under the Proposed Action are addressed through Federal and state permitting program requirements under NSR regulations (40 CFR 51 and 52). Local stationary source permits are issued and enforced by RAPCA. As noted previously, WPAFB has appropriate permits in place and has met all applicable permitting requirements and conditions for existing stationary devices. No new or modified stationary sources are anticipated as part of the Proposed Action.

**National Emissions Standards for Hazardous Air Pollutants.** Because WPAFB has the potential to emit more than 25 tpy of hazardous air pollutants, certain hazardous air pollutant-emitting activities on Base are subject to regulation under National Emissions Standards for Hazardous Air Pollutants (NESHAP), are promulgated in 40 CFR Parts 61 and 63. These NESHAP require emissions control measures and detailed recordkeeping to show compliance with NESHAP restrictions on the types of materials, such as paints, adhesives, and solvents, which can be used in specific operations. Specific NESHAP to which activities at WPAFB are subject include:

- 40 CFR 63 Subpart GG, Aerospace NESHAP
- 40 CFR 63 Subpart ZZZZ, Reciprocating Internal Combustion Engines Maximum Achievable Control Technology
- 40 CFR 61 Subpart M, Asbestos Remediation

In addition, WPAFB would also be subject to the Defense Land Systems and Miscellaneous Equipment (DLSME) NESHAP when that rule is promulgated. This rule would cover military surface coating operations other than those subject to the Aerospace and Shipbuilding NESHAP. The intent is to simplify compliance for DoD facilities that are currently forced to comply with multiple overlapping, and sometimes conflicting, NESHAP, including the Miscellaneous Metal Parts and Products Coating NESHAP, Plastic Parts and Products Coating NESHAP, Metal Furniture Coating NESHAP, Large Appliance Coating NESHAP, and Fabric and Other Textiles Coating NESHAP. USEPA currently has no date set for publication of a draft DLSME NESHAP.

**Conformity.** Because both a maintenance area and a nonattainment area are affected by this Proposed Action, the USAF must comply with the Federal General Conformity Rule. To do so, an analysis has been completed to ensure that, given the changes in direct and indirect emissions of the O<sub>3</sub> precursors (NO<sub>x</sub> and VOCs), direct PM<sub>2.5</sub>, and PM<sub>2.5</sub> precursors (SO<sub>2</sub> and NO<sub>x</sub>), the Proposed Action would be in conformity with CAA requirements. The Conformity Determination requirements specified in this rule can be avoided if the project nonattainment pollutant rate increase resulting from the Proposed Action is below *de minimis* threshold levels for each nonattainment pollutant. For purposes of determining conformity in these nonattainment areas, projected regulated pollutant emissions associated with the Proposed Action were estimated.

Based on a review of the proposed activities associated, it has been determined that the potential sources of PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub> and VOC pollutant emissions associated with the Proposed Action would be from (1) wood chipping activities associated with the Proposed Action and (2) wood chipping engine emissions. Under the Proposed Action, no specific timeline for implementation of the proposed activities has been established. To develop a worst case annual emission scenario, it was conservatively assumed that all wood chipping and pruning activities would be completed within one calendar year. The scope of the analysis was limited to those operations or activities that result in emissions that would be directly or indirectly attributable to the implementation of the Proposed Action.

The potential air quality impacts have been assessed based on the characteristics of the Proposed Action (i.e., tree removal and pruning) and are presented below. It is noted that due to the conservative nature of the input parameters for the emissions calculations for the Proposed Action, the same assumptions were used for both the Proposed Action and Alternative B (woody vegetation removal, variable height cutting, pruning). Therefore, impacts under the Proposed Action would be the same for Alternative B.

**Wood Chipping / Engine Emissions**

Short-term adverse impacts for the Proposed Action include negligible impacts from increases in emissions from vehicles involved in tree removal and cutting/pruning operations. The removal and pruning operations would be expected to generate particulate emissions as a result of cutting and chipping of trees and other vegetation.

Emission estimates from woodchip handling operations were based on conservative assumptions regarding specifications for industrial wood-chipping equipment (e.g., engine rated capacity, maximum capacity of wood chipper). Assumptions were intended to represent a “worst-case” scenario for potential air emissions. It was also assumed that the tree-cutting project would be conducted during 40-hour workweeks, for a maximum of 3 weeks at each site. Because the trees at Treatment Site A would be pruned, wood chipping is assumed to be performed at 17 sites instead of 18 sites. During the entire project, the wood chipper would be expected to operate approximately one-third of the time. The resulting emissions estimates are presented in **Table 4-2**.

**Table 4-2. Net Changes in Wood Chipping Emissions Associated with the Proposed Action**

Air Pollutant Emissions Source	NO <sub>x</sub> Emissions (tpy)	VOC Emissions (tpy)	SO <sub>2</sub> Emissions (tpy)	PM <sub>2.5</sub> Emissions (tpy)
Chip Conveyance Emissions	-	-	-	0.22
Diesel Engine Emissions	6.48	0.19	0.07	0.19
<b>Total Emission Increase</b>	<b>6.48</b>	<b>0.19</b>	<b>0.07</b>	<b>0.41</b>
<i>de minimis</i> Limit Threshold	100	100	100	100

NO<sub>x</sub> = nitrogen oxides; PM<sub>10</sub> = particulate matter with a diameter of 10 microns; PM<sub>2.5</sub> = particulate matter with a diameter of 2.5 microns; SO<sub>2</sub> = sulfur dioxide; VOC = volatile organic compounds. PM<sub>2.5</sub> emissions are based on PM<sub>10</sub> emission calculations to be conservative. tpy = Tons per year.

Based upon the conformity applicability criteria requirements and the current attainment status of the areas affected by WPAFB wood chipping operations, this conformity analysis focuses upon potential air emissions of O<sub>3</sub> precursors, (i.e., VOCs and NO<sub>x</sub>), PM<sub>2.5</sub> direct emissions, and PM<sub>2.5</sub> precursors (i.e. SO<sub>2</sub> and NO<sub>x</sub>). This analysis does not address pollutants for which affected areas are in “attainment”, NO<sub>2</sub>, CO, PM<sub>10</sub>, and Pb.

As shown in **Table 4-2**, the Proposed Action would have a negligible impact on the ability of the Dayton-Springfield area to retain its "maintenance" status. A conformity determination, in accordance with 40 CFR 93.153(b)(2), is not required because the total of ozone precursors, PM<sub>2.5</sub> direct, and PM<sub>2.5</sub> precursor emissions from the Proposed Action would be below the thresholds specified in 40 CFR 93.153(b)(2). As shown in **Table 4-2**, the Proposed Action would not result in net emission increases above conformity *de minimis* limits listed. This conclusion is supported by the calculations attached to this analysis and presented in **Appendix C**.

According to 40 CFR 81 Subpart D, no Class I visibility areas are located within 6.2 miles of WPAFB. The closest Federal Class I area is Mammoth Cave National Park in Kentucky, 199 miles to the south. Therefore, air emissions from the Proposed Action would not affect any Class I area.

The Proposed Action is projected to result in short-term emissions increases for all pollutants. The maximum Proposed Action-related net emissions increases are below all General Conformity *de minimis* thresholds. As a result of the Proposed Action, there would be negligible long-term impacts in air quality over current conditions.

#### **4.2.3 Alternative B**

Due to the conservative nature of the input parameters for the emissions calculations for the Proposed Action, the same assumptions were used for the Proposed Action and Alternative B. Therefore, impacts under the Proposed Action would be the same for Alternative B.

#### **4.2.4 No Action**

The No Action alternative would have no adverse impact on air quality because there would be no increase in emissions.

### **4.3 Noise**

#### **4.3.1 Evaluation Criteria**

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts were evaluated quantitatively for both the No Action and the Proposed Action for the conditions expected when tree removal and pruning is complete.

#### **4.3.2 Proposed Action**

##### ***Wood Chipping / Engine Emissions***

Implementation of the Proposed Action would have minor, temporary effects on the noise environment near the treatments sites resulting from the use of wood chipping equipment for tree removal and pruning. Nearby facilities and residences would experience muffled construction noise during the workday. However, noise generation would last only for the duration of tree removal/pruning activities, and could be reduced through restriction of activities to normal working hours (between 7:00 a.m. and 5:00 p.m.).

Because the noise environment on Base and in the vicinity of WPAFB is dominated by military aircraft overflights, noise produced by redevelopment activities would not affect sensitive receptors on or off the Base. Noise associated with proposed wood chipping and chipping engines would be comparatively

minor. The Wright Memorial is located in the <65 dB noise zone while the areas northeast (i.e., Sandhill) and southwest of the runways (Riverview Road and Trout Creek) are located in the <65 to 80 dB noise zone (WPAFB 1995a).

Impacts on ambient noise levels from the work area would result from pruning and vegetation removal activities involving heavy equipment such as trucks, wood chippers, and chain saws. Noise levels associated with common construction equipment are trucks: 83-93 dB at 50 ft (Center 2011); chippers: 100-120 dB (Engels 2001); and chain saws: 125 dB (Center 2011).

An unusual property of noise is that the sound pressure levels of two separate sounds are not directly additive. For example, two sounds of 70 dB each occurring in the same location results in a cumulative noise level of 73 dB, not a doubling to 140 dB. In addition, if two sounds are of different levels, the lower level adds less to the cumulative total as the difference increases. For example, of a 60 dB noise source were used in conjunction with a 70 dB noise source, a cumulative noise level of 70.5 dB would result. When two noise sources have greater than 10 dB difference, the lower noise source adds almost nothing to the higher noise level.

Other workers in nearby areas or occupants of buildings or residences would likely be affected by noise from tree-cutting operations. Based on the estimated noise measurements for equipment discussed in this section and the sound level increases described in Section 3.3, persons at a distance of approximately 50 ft from the work area could experience sound levels greater than 25 dB over the background level used in land use compatibility planning and environmental assessments (i.e., 65 dB).

There could be minor short-term adverse impacts from noise at Treatment Sites along Trout Creek (Sites 1A and B), Riverview Road (Sites 2, 3, and 4), and Wright Memorial (Site A) for workers in the vicinity of these sites. However, there are no residences in these areas. Commercial building occupants and residents near the Sandhill area (Sites C through K and 5 through 7) could experience minor short-term adverse impacts. The majority of buildings and residences, however, are located well over 50 ft from the Treatment Sites. For example, one of the closest points in the residential area at Sandhill is the intersection of Highview Drive and Sandhill Road, which is approximately 750 ft from Treatment Site D. Short-term impacts from noise would be intermittent. The equipment is expected to operate intermittently. Tree-cutting operations are expected to be performed for approximately 3 weeks at each site during normal working hours (7:30 a.m. to 4:00 p.m.). No long-term adverse impacts would result from the proposed project.

In addition, short-term minor impacts would occur during additional operation of heavy equipment (e.g., stump removal, transportation of wood chips) and usage of chain saws. Increases in noise levels are expected to be intermittent. No long-term adverse impacts on noise levels would be expected. Due to the short duration, these impacts would be minimal.

Workers involved in tree-cutting and wood-chipping operations could experience short-term adverse effects during work in the Treatment Sites. Noise levels would be expected to be more intense in these areas. These effects would be minimized because workers would be responsible for adhering to health and safety regulations.

#### **4.3.3 Alternative B**

Impacts as a result of this alternative would be similar to the Proposed Action.

#### **4.3.4 No Action**

The No Action alternative would have no adverse impact on noise quality.

### **4.4 Geology and Soils**

#### **4.4.1 Evaluation Criteria**

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of a proposed action on geological resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

Analysis of potential impacts on geological resources typically includes the following steps:

- Identification and description of resources that could potentially be affected
- Examination of a proposed action and the potential impacts this action may have on the resource
- Assessment of the level of potential impacts
- Provision of mitigation measures in the event that potentially adverse impacts are identified

Effects on geology and soils would be adverse if they would alter the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure or function within the environment.

#### **4.4.2 Proposed Action**

##### ***Wright Memorial Area***

The Miamian-Urban land complex soils at the Wright Memorial area consists of well-drained soils that formed in medium-textured glacial till. The compact till tends to limit roots to a moderate depth. The soil in this area is characterized by generally rapid runoff, and the potential for erosion on disturbed areas is high. However, impacts to soil would be expected to be minor because the area is covered with grass and pruning activities would be short duration. No long-term adverse impacts would be expected.

##### ***Riverview Area***

The soils of Treatment Sites 2, 3, and 4 are of the Sloan-Fill complex. The land surface at these sites is nearly level soil with some below grade areas. The probability for erosion from these areas, even if the surface soil is disturbed during treatment application, is minimal.

Treatment Sites 1A and B are the very poorly drained organic soils of the Linwood series. These soils have a high water table for most of the year and are commonly ponded. Many areas are kept saturated by water from springs or seeps from adjacent uplands or from underground aquifers. Tree removal in these areas would likely result in increased ponding of surficial water due to the reduction in foliage. However, with the flat land surface it is unlikely that an increase in erosion will occur.

In the short-term, vehicles and heavy equipment would disturb surface and compaction would be altered. Impacts would be minimized because erosion controls would be implemented. There would be no long-term adverse effects because vegetation would eventually be re-established.

#### ***Sandhill Area***

##### **Sites C through K and 7**

Treatment Sites C through K and Site 7 are located adjacent to and on the slopes of Sandhill. The majority of the trees identified for treatment in this area are located along sloping hillsides. The trees and underlying brush throughout this area are presently dense and allow for little ground vegetation to grow. After removing vegetation in the CZs, an increase in runoff and possibly erosion may occur until the natural ground cover vegetation is established. Adverse impacts would be minimized because erosion controls would be implemented.

##### **Sites 5 and 6**

Treatment Sites 5 and 6 are located adjacent to Haddix Road on relatively flat terrain. As indicated previously, surface soil would be disturbed from heavy equipment and compaction would be altered. Impacts would be minimized because erosion controls would be implemented. However, there would be no long-term adverse impacts and a vegetation cover would eventually be re-established.

#### **4.4.3 Alternative B**

##### ***Wright Memorial Area***

Impacts would be the same for those described under the Proposed Action.

##### ***Riverview Area***

Impacts would be the same for those described under the Proposed Action. Potential adverse impacts to soil quality may occur if an herbicide is applied outside its label specifications. Impacts would be minimized, however, by ensuring that herbicides were applied as directed on the label.

##### ***Sandhill Area***

Impacts would be the same for those described under the Proposed Action. Potential adverse impacts to soil quality may occur if an excessive amount of herbicide is used to control vegetation. This risk would increase if the herbicides were applied during just or prior to periods of precipitation. Impacts would be minimized, however, by ensuring that herbicides were applied as directed on the label.

#### **4.4.4 No Action**

Surface and subsurface soils at the three Treatment Sites would not be impacted under the No Action alternative.

### **4.5 Water Resources**

#### **4.5.1 Evaluation Criteria**

Evaluation criteria for impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Impacts would be adverse if proposed activities result in one or more of the following:

- Reduces water availability or supply to existing users
- Overdrafts groundwater basins
- Exceeds safe annual yield of water supply sources
- Affects water quality adversely
- Endangers public health by creating or worsening health hazard conditions
- Threatens or damages unique hydrologic characteristics
- Violates established laws or regulations adopted to protect water resources

#### **4.5.2 Proposed Action**

##### **Groundwater and Surface Water**

The groundwater and surface water systems that surround WPAFB are closely interconnected. Runoff contaminants that might result from trimming/pruning operations that would impact surface water quality could also impact groundwater quality. Therefore, they are analyzed together.

##### ***Wright Memorial Area***

Because there would be minimal disturbance to surface soils during treatment, adverse impacts due to potential erosions from the steep surrounding slopes into the surface water drainages that parallel SR 444 would be negligible.

##### ***Riverview Area***

No impacts to surface water quality are expected under the Proposed Action. The land surface of the Treatment Sites in this area is below the surrounding roadway grade and there is little potential for erosion. Furthermore, erosion controls would be implemented.

##### ***Sandhill Area***

##### **Sites C through K and 7**

The majority of the trees identified for treatment in this area are located along sloping hillsides. Existing trees and underlying brush throughout this area are dense and allow for little ground vegetation to grow. After removal of vegetation in the CZs, an increase in runoff and possibly erosion may occur until the natural ground cover is established. To minimize surface run-off, erosion controls would be implemented.

### Sites 5 and 6

Treatment Sites 5 and 6 are located adjacent to Haddix Road on relatively flat terrain. To minimize surface run-off, erosion controls would be implemented.

### **Floodplains**

According to EO 11988, *Floodplain Management*, any new construction in the regulatory floodplain must apply accepted flood protection to reduce the risk of flood-associated damages; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains.

The elevation of the Wright Memorial and Sandhill Area Treatment Sites are above the 100-year floodplain elevation (814.3 ft, MSL) and reduction of floodplain management capacity would not be impacted by the Proposed Action in these areas. The Riverview Area Treatment Sites are relatively flat and lie within the 100-year floodplain.

There is no practicable alternative to action in the floodplain. The clear zone and glide slope for the runway must be in a fixed location; therefore, the only practicable alternatives to meet the purpose and need would result in actions in floodplains.

The selected alternative treatments do not require the removal or addition of flood control capacities or building in the floodplain. Therefore, floodplain management would not be adversely impacted at any of the Treatment Sites under any of the proposed alternatives. The potential exists for a short-term increase in runoff from some of the individual sites after tree removal; this temporary condition would exist until the re-establishment of ground cover vegetation.

As part of the IICEP process for this EA, consultation with the MCD was conducted. According to a letter dated September 8, 2011, the MCD indicated no objection to the proposed project; however, three conditions would be required, which include (correspondence letters included in **Appendix A**):

1. Filling holes and site grading of areas where stumps are removed will be permitted as long as material is used from the same vicinity. No fill may be placed within the Huffman Retarding Basin below elevation 835 without prior approval from the MCD office and a compensation agreement indicating the source of the material.
2. Trees should not be removed from the banks of the Mad River. A natural barrier strip along the river is critical to the physical and biological health of the waterways.
3. Vegetative material may be ground up or disposed of within the retarding basin. Trees and stumps that are not ground up should be cut into short pieces so they would not block the conduits of the dam if they were to float during high water event.

#### **4.5.3 Alternative B**

Impacts on water resources as a result of this alternative would be the same as the Proposed Action.

#### **4.5.4 No Action**

The No Action alternative would have no adverse impact on water resources.

### **4.6 Biological Resources**

Biological resources that could be impacted by the proposed project include vegetation, wildlife, threatened and endangered species, and wetlands; water availability, quality and use; existence of floodplains; and associated regulations.

#### **4.6.1 Evaluation Criteria**

Evaluation criteria for impacts on biological resources are based on:

- Importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- Proportion of the resource that would be affected relative to its occurrence in the region;
- Sensitivity of the resource to the proposed activities; and
- Duration of ecological ramifications.

The impacts on biological resources would be adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid “taking” threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project.

#### **4.6.2 Proposed Action**

##### **Vegetation**

Vegetation within the proposed treatment sites are mainly scrub thickets, old fields, mowed/maintained areas, and some woodlands. There are several landfills associated with Treatment Sites 2, 3, 4, and G. All of these are comprised of mowed/maintained areas except for a small portion of Treatment Site 4, which is forested. These land-disturbing activities associated with the Proposed Action are limited to Base property. Short-term, localized effects on vegetation would be expected however, due to the frequency of the vegetation types on and off base, negligible long-term adverse effects on vegetation would be expected as a result of the implementation of the Proposed Action at WPAFB.

### **Wetlands**

Cutting/trimming of trees or any other related disturbance activity would not occur within any jurisdictional wetlands identified on the Base. Therefore, no adverse effects on wetlands are expected at WPAFB as a result of the Proposed Action.

### **Wildlife**

Wildlife habitat within the improved areas of the Base is limited due to fragmentation by the existing facilities, roads, and impervious surfaces at WPAFB. The Proposed Action would have short-term, localized effects on habitat available to the terrestrial animals that occur at WPAFB due to the transient nature of terrestrial species in general. Additionally, this assessment is based on the limited extent of areas that would be affected by the Proposed Action and the frequency of occurrence of the terrestrial species known to occur at WPAFB. Therefore, no long-term or adverse effects on wildlife would be expected to result from the Proposed Action.

### **Threatened and Endangered Species**

There are approximately 740 acres of forest/woodland habitat on WPAFB. Many of these acres are associated with stream corridors and provide suitable foraging habitat for the Indiana bat. While not common, there are occasional trees with peeling bark or cavities in many of forested communities that may provide suitable summer roost habitat. In 2001, BHE Environmental, Inc. conducted mist net surveys and of 33 bats captured, two were Indiana bats (BHE 2001). Both Indiana bats were tracked using radiotelemetry and data gathered in the study indicated that these two bats used areas up to approximately 3 miles away from their capture sites. According to several recent studies, female Indiana bats have traveled from 0.3 to 5.2 miles from roost to foraging areas (USFWS 2007). A maternity tree was identified on the grounds of Wright State University, approximately 2 miles from Treatment Sites identified in this EA. In 2007, Eco-Tech Consultants, Inc. conducted mist net surveys resulting in the capture of 5 Indiana bats (Eco-Tech 2007). The 2007 survey did not include radiotelemetry and the known roost trees were not verified.

Approximately 590 acres of forest cover is located within 0.6 miles (on and off-base) of the mist net capture sites. Approximately 30 acres of the 590 acres of forest cover within 0.6 miles of capture sites would be removed as a result of the Proposed Action, resulting in the retention of 95 percent of forest cover in those areas. If any potential roost trees occur within the treatment sites, they would not be removed during the summer maternity season (April 1 through September 30). However, the lack of potential summer roost trees in the treatment sites would exclude any direct impact on the Indiana bat. Therefore, the Proposed Action is not expected to adversely affect the Indiana bat.

While there is no requirement to survey the proposed project areas for potential habitat for the eastern massasauga rattlesnake, a preliminary survey of the Riverview and Sandhill areas performed on March 22, 2011, did not encounter any evidence of burrows (crayfish or small mammals ) occurring within open

wetlands for winter hibernation with adjacent upland forests for foraging during the summer. In 2010, a survey began and continues in the Sandhill area. Previous surveys have also reported no sitings of the massasauga rattlesnake within the project areas. Therefore, no impacts to the Federal candidate eastern massasauga or any state-listed species are anticipated.

There are two state-listed plants within the vicinity of the proposed project areas. The Great Plains ladies'-tresses, a rare orchid, is known with populations in the Sandhill area (WPAFB 2011a). None of the currently known populations occur within any treatment sites, but potential habitat occurs within Treatment Sites G, J, and K. Additionally, any mechanized equipment movement associated with Treatment Sites E, F, H, and I could impact potential habitat. The habitat is an open, glade-like habitat with scattered flat limestone outcrops and scrub thickets. The ear-leaved foxglove, a rare annual herb, is known from one population in the same vicinity and in close proximity to one population of the Great Plains ladies'-tresses. Potential ear-leaved foxglove habitat occurs within Treatment Sites G and J.

No heavy equipment would be allowed to traverse the potential habitat areas for either the Great Plains ladies'-tresses or the ear-leaved foxglove. Additionally, vegetation within Treatment Sites G, J, and K consist of scrub thickets with few trees tall enough to necessitate pruning to the required height based on their distance from the runways. Care would be taken by the contractor accessing Treatment Sites E, F, H, and I with mechanized clearing equipment along designated pathways so as not to impact potential habitat. Consequently, the Proposed Action is unlikely to jeopardize potential habitat or occurrences of these state-listed plants.

Records indicate the upland sandpiper has been observed within the proposed project area. However, the sandpiper has not been observed within any of the treatment sites. This bird prefers open grasslands, pastures, and especially the open areas around airport runways which is where it has been observed at WPAFB. The sandpiper would unlikely occur within any of the treatment sites and therefore would not be impacted by the Proposed Action.

The eastern box turtle is a species of concern in Ohio. And, while relatively common, it is thought that the numbers of the eastern box turtle have declined due in part to overcollecting and roadkills. Several turtles have been observed in the Sandhill area (WPAFB 2011a). While no sitings have been documented as occurring in the locations of the treatment sites, potential habitat for the eastern box turtle occurs within most, if not all, of the treatment sites. Treatment Sites G and J in the Sandhill area would involve pruning and the necessary hand-operated equipment. No heavy equipment would be allowed to traverse the potential habitat areas and any sitings of the eastern box turtle within or near the proposed treatment sites during pruning activities would necessitate the removal of the turtle(s) to safe ground.

Overall, the Proposed Action is not likely to jeopardize the existence of Federal- or state-listed threatened and endangered species within the proposed project areas.

As part of the IICEP process for this EA, WPAFB requested informal consultation from USFWS on the Proposed Action. Copies of correspondence with USFWS are provided in **Appendix A**. The USFWS recommended the following:

- Proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat, such as forests, streams, and wetlands;
- Implement best construction techniques to minimize erosion and natural buffers should be preserved around streams and wetlands to enhance beneficial functions;
- Mulch and revegetate all disturbed areas in the project vicinity with native plant species;
- Trees in the Mad River and Trout Creek riparian corridors should be preserved to protect Indiana bat species and habitat. Recommend trees be trimmed in these areas (Sites 1A and B) to preserve and aid in creation of habitat trees for the bat;
- Site 1A project related activities should be restricted to November 15 through March 1 when the eastern massasauga snake would be dormant;
- If the proposed project directly or indirectly impacts the clubshell, snuffbox, or rayed bean habitat types, then surveys should be conducted to determine the presence or probable absence of these species.

No adverse effects on threatened and endangered species would be expected as a result of the Proposed Action at WPAFB.

#### **4.6.3 Alternative B**

Similar to the Proposed Action, short-term, localized effects on vegetation and wildlife would be expected, with negligible long-term adverse effects as a result of the implementation of Alternative B. No adverse effects on wetlands are expected at WPAFB as a result of this alternative.

Alternative B is not likely to jeopardize the continued existence of Federal- or state-listed threatened and endangered species within the proposed project areas.

#### **4.6.4 No Action**

The No Action alternative would have no adverse impact on biological resources.

### **4.7 Cultural Resources**

#### **4.7.1 Evaluation Criteria**

Adverse impacts on cultural resources might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sell, transfer, or

lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

#### **4.7.2 Proposed Action**

##### ***Wright Memorial Area***

The Wright Memorial area is considered a historic landscape. The trees are part of the historic landscape, which why pruning rather than cutting is proposed for these trees. There would be no intrusive ground disturbance. One mound is located adjacent to a tree that would be pruned. No adverse impacts to cultural resources would occur because the mounds would be identified in the field and vehicular traffic would be minimized.

In the event that cultural items are encountered during project activities, work would cease immediately and the Base Historic Preservation Officer would be contacted to assess the items.

##### ***Riverview Area***

None of the Treatment Sites are located on any identified cultural resource sites. In addition, no intrusive ground disturbances would be expected during the cutting operation or by vehicles used during the project. In the event mechanical methods are used under the Proposed Action to remove plant species, there could be additional minor disturbances to the ground surface. Therefore, no adverse impacts to cultural resources are expected to occur under the Proposed Action.

##### ***Sandhill Area***

Prehistoric archaeological Site 33 GR 890 is located within Treatment Site G and potential historic archaeological location R8 T3 S28 #8 is located within Treatment Site 7. No intrusive ground disturbances would be expected during the cutting operation. No adverse impacts would occur under the Proposed Action because Site 33 GR 890 and location R8 T3 S28 #28 would be identified in the field and vehicular traffic would be minimized.

As part of the SHPO coordination for this EA, WPAFB submitted a letter of no adverse effect as a result of the Proposed Action to the Ohio Historic Preservation Office (letter dated June 20, 2011 and presented in **Appendix A**). The SHPO responded in a letter dated July 20, 2011, indicating that historic resources determined to be eligible for listing on the National Register of Historic Places within the APE are the Wright Brothers Memorial Mound Group and the Wright Brothers Memorial Monument, both located within Treatment Site A. The proposed work in this treatment site is limited to pruning less than 20 trees, which would not require the use of heavy equipment that has the potential to disturb archaeological sites. In addition, the proposed work would not alter the character of the designed landscape surrounding the historic monument. Based on this information, the SHPO concurred that the proposed project would have no adverse effect to historic properties (letter presented in **Appendix A**).

### **4.7.3 Alternative B**

Similar to the Proposed Action, Alternative B would have no adverse impacts on cultural resources because potential archaeological sites would be identified in the field and vehicular traffic would be minimized.

### **4.7.4 No Action**

The No Action alternative would have no adverse impact on cultural resources.

## **4.8 Socioeconomics**

### **4.8.1 Evaluation Criteria**

Elements of the proposed project include tree cutting/pruning activities within the glide slope, clear zone, and transitional area at WPAFB. The level of action expenditure impacts is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates ten employment positions might be unnoticed in an urban area, but might have adverse impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they would be considered adverse.

This section identifies potential economic and social impacts that might result from the proposed project. The methodology for the economic impact assessment is based on the Economic Impact Forecast System (EIFS) developed by the DoD in the 1970s to efficiently identify and address the regional economic effects of proposed military actions (EIFS 2001). EIFS provides a standardized system to quantify the impact of military actions, and to compare various options or alternatives in a standard, non-arbitrary approach.

The EIFS assesses potential impacts on four principal indicators of regional economic impact: business volume, employment, personal income, and population. As a “first tier” approximation of effects and their significance, these four indicators have proven very effective. The methodology for social impacts is based on the Guidelines and Principles for Social Impact Assessment, developed by an inter-organizational committee of experts in their field (National Oceanic and Atmospheric Administration (NOAA) 1994).

The proposed project at WPAFB would have an adverse impact with respect to the socioeconomic conditions in the surrounding MSA if it would:

- Change the local business volume, employment, personal income, or population that exceeds the MSA’s historical annual change; and/or
- Negatively affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates.

#### **4.8.2 Proposed Action**

Nominal, temporary socioeconomic impacts could occur during the tree trimming/pruning activities. The Proposed Action would have no long-term effects on employment, population, personal income, poverty levels, or other demographic or employment indicators in the Dayton–Springfield MSA. The Proposed Action does not involve changes in off-Base land use or new development; therefore, no adverse impacts on social conditions are anticipated.

In addition, EO 13045 requires that Federal agencies identify and assess environmental health and safety risks that might disproportionately affect children. The Proposed Action would not likely pose any adverse or disproportionate environmental health or safety risks to children living in the vicinity of the Base. The likelihood of the presence of children at the site where the Proposed Action would occur on Base is considered minimal, which further limits the potential for effects. Therefore, no adverse effects would be expected.

#### **4.8.3 Alternative B**

Impacts to socioeconomics are the same as for the Proposed Action.

#### **4.8.4 No Action**

The No Action Alternative would have no adverse impact upon socioeconomics over current conditions.

### **4.9 Environmental Justice**

#### **4.9.1 Evaluation Criteria**

This section evaluates environmental justice concerns to include disproportionate impacts on low-income or minority populations. The proposed project at WPAFB would have an adverse impact with respect to environmental justice in the surrounding MSA if it would disproportionately impact minority populations or low-income populations.

#### **4.9.2 Proposed Action**

As discussed in Section 3.9.1, the USAF has issued guidance on Environmental Justice analysis. To comply with EO 12898, ethnicity and poverty status in the study area have been examined and compared to state and national statistics to determine if minority or low-income groups could be disproportionately affected by the Proposed Action. The review indicates that residents living within Census Bureau Tracts 2001, 2002, and 2007 have a lower per capita income, a higher unemployment rate, and a higher percentage of residents living below the poverty level than county or state averages (Bureau of Census 2000a). The review also indicates that the percentage of minority residents is somewhat higher than county or state averages.

Potential adverse effects from the tree trimming/pruning activities would occur on the Base, with no adverse effects anticipated off-Base. The environment around WPAFB is influenced by USAF

operations, land management practices, vehicle traffic, and emissions sources outside the Base. Increased traffic from temporary tree trimming/wood chipping activities would affect local air quality, but these short-term effects would be dispersed and affect area residents and Base employees equally. The proposed trimming/pruning activities would be performed by outside contractors with employees living within Greene County and the ROI.

No disproportionate short- or long-term effects on minority or low-income populations from the Proposed Action are anticipated.

#### **4.9.3 Alternative B**

Impacts to environmental justice are the same as for the Proposed Action.

#### **4.9.4 No Action**

The No Action Alternative would have no adverse impact over current conditions with respect to environmental justice.

### **4.10 Infrastructure**

#### **4.10.1 Evaluation Criteria**

Impacts on infrastructure are evaluated for their potential to disrupt or improve existing levels of service and additional needs for energy and water consumption, sanitary sewer systems, and transportation patterns and circulation. Impacts might arise from physical changes to circulation, construction activities, introduction of construction-related traffic on local roads or changes in daily or peak-hour traffic volumes, and energy needs created by either direct or indirect workforce and population changes related to Base activities.

#### **4.10.2 Proposed Action**

##### **Transportation Systems**

Temporary tree trimming/pruning activities associated with the Proposed Action are anticipated to produce short-term negligible adverse impacts on traffic generation and traffic volume on-Base. It is estimated that the total personnel working on-site on trimming/pruning activities would be approximately 3-5 workers at any one time.

The Proposed Action would affect traffic generation on-Base over the short-term. Increases in traffic volumes and adverse impacts to traffic flow on-site are likely due to additional traffic entering, leaving, and cycling throughout the Treatment Areas as a result of contractors performing trimming/pruning activities. In particular, there would be an overall increase in the volume of truck equipment traffic as a result of trimming/pruning operations.

Wood chipping equipment would be driven to the project locations and would be kept at the Treatment Sites during the duration of the project. All damaged Base transportation infrastructure from construction activities on the Base would be repaired.

No long-term adverse impacts are anticipated. Therefore, negligible effects on transportation systems would be expected under the Proposed Action.

### **Electrical Power**

The Proposed Action would result in a negligible, if any, net change in the electrical power system. Therefore, negligible adverse effects on the electrical power would be expected under the Proposed Action.

### **Natural Gas**

The Proposed Action would result in a negligible, if any, net change in the natural gas system. Therefore, negligible adverse effects on natural gas demand would occur as a result of the Proposed Action.

### **Water Supply**

The Proposed Action would result in a negligible increase of personnel and use of the water supply system resulting in a negligible increase in the demand for water. Therefore, there would be no negligible adverse effects on the water supply system as a result of the Proposed Action.

### **Pollution Prevention**

It is anticipated that the Proposed Action would not affect the Pollution Prevention Program at WPAFB. Quantities of hazardous material and chemical purchases, off-Base transport of hazardous waste, disposal of MSW, and energy consumption would continue at levels similar to current levels.

### **Solid Waste**

In considering the basis for evaluating the level of impacts on solid waste, several items are considered. These items include evaluating the degree to which the proposed construction/renovation projects would affect the existing solid waste management program and capacity of the area landfill.

No solid waste is expected to be generated from the proposed trimming/pruning activities other than organic wastes (wood chips). Contractors would be responsible for the management and disposal of solid wastes. The Proposed Action would have a minor, adverse impact on the solid waste management program at WPAFB.

### **Sanitary Sewer and Wastewater Systems**

The Proposed Action would not result in a net change in the use of the sanitary sewer system. Therefore, no adverse impacts on the sanitary sewer system would result because of the Proposed Action.

### **Heating and Cooling**

The Proposed Action would not result in a net change in heating and cooling systems usage. Therefore, no adverse impacts on heating and cooling systems would result from the Proposed Action.

### **Communications**

The Proposed Action would not result in a net change in communications systems. Therefore, no adverse impacts on the communications system would result from the Proposed Action.

#### **4.10.3 Alternative B**

Impacts to infrastructure are the same as for the Proposed Action.

#### **4.10.4 No Action**

Under the No Action Alternative, there would be no change in baseline conditions and none of the proposed tree trimming/pruning activities would occur. Therefore, there would be no impact on WPAFB's infrastructure.

### **4.11 Health and Safety**

#### **4.11.1 Evaluation Criteria**

Impacts on health and safety are evaluated for their potential to jeopardize the health and safety of Base personnel as well as the surrounding public. Impacts might arise from physical changes in the work environment, construction activities, introduction of construction-related risks, and risks created by either direct or indirect workforce and population changes related to proposed Base activities.

USAF regulations and procedures promote a safe work environment and guard against hazards to the public. WPAFB programs and day-to-day operations are accomplished according to applicable USAF Federal and state health and safety standards.

#### **4.11.2 Proposed Action**

##### **Fire Hazards and Public Safety**

No adverse effects regarding fire hazards or public safety would be expected to occur on Base from trimming/pruning projects planned as part of the Proposed Action.

##### **Contractor Safety**

Short-term minor adverse effects would be expected from proposed cutting/pruning activities. Implementation of the Proposed Action would slightly increase the short-term risk associated with contractors performing the cutting/pruning at WPAFB during the normal work day.

Contractors would be required to establish and maintain safety programs, and adhere to SOPs. Projects associated with the Proposed Action would not pose a safety risk to Base personnel or to activities at the Base.

Any potential adverse impacts to the health and safety of nearby personnel will be minimized by clearly identifying the work zone and prohibiting access to unauthorized individuals. Use of high-profile equipment will require a “spotter” when operating near any overhead hazards. To minimize vehicle accidents, construction personnel will direct heavy vehicles entering and exiting the site. WPAFB has also incorporated stringent safety standards and procedures into day-to-day operations. Therefore, no adverse effects are anticipated as a result of the Proposed Action due to safeguards existing to protect personnel.

Cutting or removing trees that do not comply with UFC 3-260-01 would have a beneficial, long-term impact on flight safety during approach and departure from the runways.

The potential for impacts upon the safety of workers involved in tree trimming and removal operations would be short-term in nature (i.e., for the duration of the project). These impacts are expected to be negligible because workers would be responsible for adhering to applicable health and safety regulations. In particular, work in areas designated for hunting would be coordinated with the Base Natural Resources Manager. Activities in the vicinity of the runways would be coordinated with the Flight Line Manager.

#### **4.11.3 Alternative B**

Impacts to health and safety are the same as for the Proposed Action.

#### **4.11.4 No Action**

Under the No Action alternative, none of the trees in the glide slope, transitional area, and clear zone would be removed or trimmed. The Air Force would be out of compliance with respect to the trees that currently project above the imaginary surfaces for these zones. As the trees continue to grow, a greater number would be expected to exceed the height restrictions and, thus, increase the probability of an accident.

An accident could result in injury or loss of life to pilot and crew as well as the potential for injury and loss of life to the population in the vicinity of the accident. The probability of an accident due to airspace obstructions at WPAFB has not been quantified for this EA. The degree and nature of the impacts would depend upon the location and severity of the accident. In the short-term and the long-term, the No Action alternative, therefore, is associated with potential adverse impacts on flight safety. The probability and severity of these impacts is unknown.

Because no trees would be trimmed or removed under the No Action alternative, there would be no adverse impacts due to tree trimming or removal operations.

## **4.12 Hazardous Materials and Wastes / Environmental Restoration Program Sites**

### **4.12.1 Evaluation Criteria**

Impacts to hazardous material management would be considered adverse if the Federal action resulted in noncompliance with applicable Federal and state regulations, or increased the amounts generated or procured beyond current WPAFB waste management procedures and capacities.

Impacts on pollution prevention would be considered adverse if the Federal action resulted in worker, resident, or visitor exposure to these materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on the ERP would be considered adverse if the Federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment. Impacts on fuels management would be adverse if the established management policies, procedures, and handling capacities could not accommodate the activities associated with the proposed project.

### **4.12.2 Proposed Action**

#### **Hazardous Materials**

Products containing hazardous materials would be procured and used during the proposed trimming/pruning activities. It is anticipated that the quantity of products containing hazardous materials used during these activities would be minimal and their use would be of short duration. Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal and state regulations. Therefore, hazardous materials management at WPAFB would not be impacted by the Proposed Action.

#### **Hazardous Waste**

It is anticipated that the quantity of hazardous wastes generated from proposed trimming/pruning activities would be negligible. Contractors would be responsible for turning in any hazardous or universal waste to 88 ABW/CEAN. Trimming/pruning would not impact the Base's hazardous waste management program.

It is anticipated that the volume, type, classifications, and sources of hazardous wastes associated with the Proposed Action would be similar in nature with the baseline condition waste streams. Hazardous waste would be handled, stored, transported, disposed of, or recycled in accordance with the WPAFB Hazardous Waste Management Plan. Therefore, it is anticipated that the Proposed Action would result in negligible adverse impacts to hazardous waste at WPAFB.

### **Stored Fuels**

Storage of fuels on Base is not anticipated as part of the Proposed Action. Any fuel used for trimming/pruning equipment would be minimal and use would be of short duration. Stored fuels at WPAFB would not be impacted by the Proposed Action and would not have an impact on the Base's SPCC Plan.

### **Asbestos-Containing Material and Lead-Based Paint**

While no facilities would be renovated/modified as part of the Proposed Action, the potential exists for asbestos-containing material and lead-based paint on underground utility lines. Should either of these toxic substances be uncovered and/or removed by contractors, they would be responsible for the management and disposal of these substances. Thus, the potential for adverse impacts would be negligible to minor.

### **Environmental Restoration Program**

#### ***Wright Memorial Area***

There are no ERP sites in the immediate vicinity of Wright Memorial. No impacts would occur in this area.

#### ***Riverview Area***

There would be minimal ground disturbance under the Proposed Action. Stumps would not be removed. Therefore, the terms of the ROD would not be violated. In addition, allowable land use specified in the Land Use Control Plan would be followed with approval by CE and the Environmental Management Division prior to any anticipated ground disturbance (WPAFB 2006b). If mechanical methods were used to remove plant species, there could be minor adverse impacts to the ground surface. This disturbance would be minor and impacts, if any, would be short-term because the ground surface would settle after a short period.

In OU3, Treatment Site 2 is located over the LF12 area and Treatment Site 4 is located over the LF14 area and FTA2. Activities associated with the Proposed Action would not be expected to impact these ERP sites. Intrusive ground disturbance during the cutting would not be anticipated since stumps will not be removed. In the short-term, however, vehicles and heavy equipment would disturb surface soils and compaction would be altered. Impacts would be minimal because erosion controls would be implemented.

At LF14, surface soil was found to contain low levels of polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), pesticides, PCBs, dioxins/dibenzofurans, and metals. A risk assessment of LF14 evaluated the potential exposure of an occupational worker and recreational user/trespasser to soil under current and future conditions. Results of the risk assessment showed that non-cancer hazard

and cancer risks do not exceed the USEPA target limits. It was determined that no further action would be taken; therefore, LF14 was not capped (WPAFB 1996).

Sampling results for FTA2 indicated that soil contains volatile organic compounds (e.g., benzene, toluene, and xylene), semivolatile organic compounds (e.g., PAHs), TPH, pesticides/herbicides, and metals. With the exception of metals, the contaminants were more concentrated in subsurface soil. It was determined that relatively low levels of soil contaminants do not pose human health or environmental risks at levels that warrant cleanup actions (WPAFB 1996).

Because LF12 was previously excavated and filled (WPAFB 1998b), contact with soil contaminants or debris would not be anticipated. Risks to human health would not be expected because risk assessment results indicated that potential risks to chemicals in soil were minimal (i.e., within USEPA's acceptable limits) (WPAFB, 1996). There would be no long-term adverse impacts to surface soil because ground cover would be re-established.

Treatment Site 3 is not physically located on any ERP site within OU3, and Treatment Sites B and 1A are not physically located on any ERP sites within OU5. Therefore, no adverse impacts to these ERP sites would be expected.

### ***Sandhill Area***

There would be minimal ground disturbance under the Proposed Action. Stumps would not be removed. Therefore, the terms of the ROD would not be violated. In addition, allowable land use specified in the Land Use Control Plan would be followed with approval by CE and the Environmental Management Division prior to ground disturbance (WPAFB 2006b). If mechanical methods were used to remove plant species, there could be minor adverse impacts to the ground surface. This disturbance would be minor and impacts, if any, would be short-term because the ground surface would settle after a short period.

For all Treatment Sites located within or near ERP sites, additional precautions should be taken to avoid damaging monitoring wells, which are used to assess groundwater contamination associated with the various OUs. These wells would be identified prior to project activities.

Under the Proposed Action, tree trimming/pruning activities would be limited to the treatment sites and there would be no adverse impacts to ERP sites.

### **4.12.3 Alternative B**

Impacts to hazardous materials and wastes are the same as for the Proposed Action.

#### **4.12.4 No Action**

The No Action alternative would have no adverse impact on hazardous materials storage and waste generation.

#### **4.13 Cumulative Impacts**

The CEQ regulations (40 CFR 1508.7) require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the foreseeable future.

Projects proposed for the reasonably foreseeable future that are relevant to the project area include the following ancillary projects for 445 AW facilities in Areas A and B at WPAFB.

##### ***West Ramp Facilities Renovations to Support C-17 Aircraft:***

*Convert Sprinklers to Wet Pipe in Buildings F/34007, F/34016, and F/34015* – Proposed activities consist of converting existing sprinkler system from pre-action to wet pipe in Area A.

*Construct Composites Workroom in Building F/34026* – Proposed project in Area A consists of modifying the interior of existing shop facility (F34026) by (1) installing a prefabricated clean room with a self-contained heating, ventilation, and air conditioning system; (2) providing lighting, power and oil-free dry nitrogen; and (3) providing a 12-ft by 12-ft roll-up door.

*Renovate Building F/34066* – This project proposes to renovate existing Facility 34066 in Area A, a former munitions shop, for assembly of replaceable countermeasure flare kits. Proposed activities include replacing doors and install low slope curbs at rolling doors; installing and replacing various lights and lighting fixtures; replacing explosion-proof receptacles; cleaning and painting restrooms and office area; and replacing a rain gutter.

*Maintain Finishes at Wing HQ in Building F/34010* – Proposed project in Area A includes replacing carpet and repainting walls.

*Maintain Finishes at Wing HQ in Building F/34012* – Proposed project in Area A includes replacing carpet.

*Repair Roof in Building F/34024* – Proposed project in Area A includes replacing the roof with standing seam metal roof including cross supports onto existing rafters; and installing underground drains for

downspouts, including surface drains to divert rainwater.

**Runway Replacement** – Proposed plans include replacing the primary runway, extending the secondary runway, and expanding easements associated with glide-slope corridor. These runway replacement and runway extension activities would occur within Area A.

**Entry Control Facility Reconfiguration and Base Perimeter Fence Relocation** – Proposed plans include reconfiguring and relocating the existing nine entry control facilities located in Area A, and changes to traffic flow in SR 444. Proposed plans also include relocating the base perimeter fence near the Kittyhawk Center.

**Overlay Hangar Parking Area** – Proposed plans include removing damaged concrete, providing asphalt overlay, and restriping the parking area in Area A.

**Human Systems Wing** – An active construction project in Area B located near the Air Force Institute of Technology (AFIT) campus.

**Information Technology Center** – Proposed new construction project in Area B located west of the AFIT campus.

These projects, should they be constructed as anticipated, are not expected to result in any cumulative impacts associated with the Proposed Action.

#### **4.14 Unavoidable Adverse Effects**

Unavoidable adverse impacts would result from implementation of the Proposed Action.

**Noise.** The noise resulting from wood chipping activities and equipment is an unavoidable condition. Although this noise would occur under the Proposed Action, the noise would be temporary and would cease upon completion of the trimming/pruning activities. Noise is not considered an adverse impact.

**Safety.** The potential for worker safety mishaps is an unavoidable condition associated with the Proposed Action. However, the potential for this unavoidable situation would not increase over baseline conditions.

**Energy.** The use of nonrenewable resources is an unavoidable occurrence, although this use is negligible compared with total use of energy. The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action or No Action alternative.

**Geology and Soils.** Under the Proposed Action, tree and vegetation removal to ground level would result in soil disturbance. Implementation of BMPs during these activities would limit potential impacts resulting from eradication activities. Standard erosion control means would also reduce potential impacts related to these characteristics.

**Biological Resources.** Vegetation removal or cutting/trimming associated with the Proposed Action would have a minimal effect on vegetation because the vegetation is common to the Base and the region. Impacts would be short-term and minor to the terrestrial wildlife due to their transient nature and the common nature of their frequency of occurrence on Base and in the region. Potential Indiana bat summer roost habitat on approximately 90 acres of forested communities on WPAFB would be affected by tree cutting/trimming as set forth by the Proposed Action. Of the 90 acres, approximately 30 acres are located within 0.6 miles of capture sites and 60 acres outside of the 0.6-mile capture site. Overall, approximately 590 acres of forested communities lie within the 0.6-mile radius from the capture site both on and off-Base. Additionally, tree removal as part of the Proposed Action would occur outside of the summer roost and maternity season.

#### **4.15 Relationship of Short-Term Uses and Long-Term Productivity**

Removal of vegetation in the CZs, transitional areas, and glide slope areas in the short-term would not affect long-term productivity of the environment. The approximately 90 acres of deciduous forest to be cleared are not rare or unique. Similar forest types occur in close proximity to the Treatment Sites. Productivity within Treatment Sites would not be lost entirely, as these similar forest types can be regenerated here or elsewhere within 100 years (long-term productivity).

#### **4.16 Irreversible and Irretrievable Commitments of Resources**

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of energy resources, land, biological habitat, and human resources. The use of these resources is considered to be permanent.

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame (e.g., energy and minerals).

**Energy Resources.** Energy resources used for the Proposed Action would be irretrievably lost. These include petroleum-based products, such as gasoline, jet fuel, diesel, natural gas, and electricity. During wood chipping, gasoline and diesel would be used for the operation of equipment and vehicles. During operation, gasoline would be used for the operation of private and government-owned vehicles. Natural gas and electricity would be used by operational activities. Consumption of these energy resources would not place an overburdening demand on their availability in the region.

**Biological Habitat.** Approximately 30 acres of Indiana bat habitat within 0.6 miles of Indiana bat mist net capture sites would be permanently removed as a result of vegetation removal activities along with an additional 60 acres of Indiana bat habitat permanently removed outside of the 0.6 mile capture sites.

Approximately 90 acres of deciduous forest would be permanently removed as a result of vegetation removal activities under the Proposed Action.

**Human Resources.** The use of human resources for construction and operation is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities.

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## ***Appendix A***

### ***Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) Correspondence***

***Miami Conservancy District Consultation Letters:***

- 1. WPAFB Request – 13Apr11**
- 2. MCD Response – 08Sep11**

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

13 April 2011

88 ABW/CEANQ  
1450 Littrell Road, Building 22  
Wright-Patterson AFB OH 45433-5209

Ms. Roxanne H. Farrier  
Miami Conservancy District  
38 E. Monument Avenue  
Dayton, OH 45402

Dear Ms. Farrier:

Wright-Patterson AFB (WPAFB) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts of removing obstructions within the glide slope and clear zones at WPAFB. The United States Air Force (USAF) has initiated an EA for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The purpose of this letter is to notify you of this proposed project and request evaluation of potential impacts of this project on the Miami Conservancy District (MCD).

The geographic location of the proposed project area is Greene and Clark Counties (Figure 1). The Proposed Action involves trimming and removing trees in 19 areas that are causing obstructions in the glide slope and clear zones of Runways 05-23R and 05-23L at WPAFB (Figures 1 and 2). A field reconnaissance indicated these areas violate height restrictions, obstruct aircraft operations, and pose danger to human health and safety. The 19 areas total approximately 90 acres and range in size from approximately 0.2 to 16 acres. The obstructions currently prevent adequate clearance for aircraft operations, violating Air Force Manual (AFMAN) 32-1123(I). AFMAN 32-1123(I) requires the removal of airspace obstacles in order to uphold safe standards for airfields. The proposed project would allow WPAFB to continue to safely support aircraft military operations.

The Proposed Action alternatives include treatment techniques (i.e., shearing, knuckle boom loader disk saw cutting, chainsaw cutting) to remove woody vegetation to ground level in the clear zone and cut to 10 feet below the approach and departure area within the glide slope. Trees proposed for pruning are located primarily in the vicinity of Wright Memorial (Figure 3). Tree stumps would be left in place at most tree removal locations. For locations where the ground would become part of a maintained lawn, the area surrounding the removed tree would be filled and seeded.

Under the No Action Alternative, no removal or pruning of vegetative obstructions in the clear zone, transitional area, or glide slope would occur. Current obstructions would continue to increase as the woody overstory continues to grow, thus increasing the safety concern for aircraft and airfield operations at WPAFB.

Areas southwest of the runways along Riverview Road (Riverview Area) and at the end of the runways (Sandhill Area) have an average ground elevation of approximately 800 feet above mean sea level (MSL), which is within the Mad River 5-year floodplain of 801.4 feet, MSL. It is not anticipated that tree trimming/removal activities in these areas would result in the reduction of flood control capacity. The average ground elevation of the Wright Memorial and areas northeast of the runways (including Sandhill) are well above the 100-year floodplain elevation of 814.3 ft, MSL. The Proposed Action would not affect flood control capacities in these areas.

The EA that is presently being conducted for the tree trimming/removal proposal will address the addition or loss of flood control capacity (if any), and the generation of any additional runoff from new landscaping. As part of

the scoping process, we would appreciate your comments regarding the level of significance that the proposed project may have on the MCD.

The USAF previously consulted with the MCD regarding tree trimming and removal. The USAF requested comments from the MCD regarding the Proposed Action in a letter dated December 3, 2001 (attached). The MCD responded in a letter dated December 13, 2001 (attached), indicating the MCD staff had no objection to the proposed tree removal and pruning near the runway and at Wright Memorial, provided the following conditions were met:

1. Filling holes and site grading of areas where stumps are removed will be permitted as long as material is used from the same vicinity. No fill may be placed within the Huffman Retarding Basin below elevation 835 without prior approval from this office and a compensation agreement indicating the source of the material.
2. Trees should not be removed from the banks of the Mad River. A natural buffer strip along the river is critical to the physical and biological health of the waterways.
3. Vegetative material may be ground up or disposed of within the retarding basin. Trees and stumps that are not ground up should be cut into short pieces so they would not block the conduits of the dam if they were to float during high water events.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at 937/257-4857 or by email at [Darryn.Warner@wpafb.af.mil](mailto:Darryn.Warner@wpafb.af.mil).

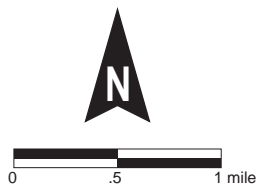
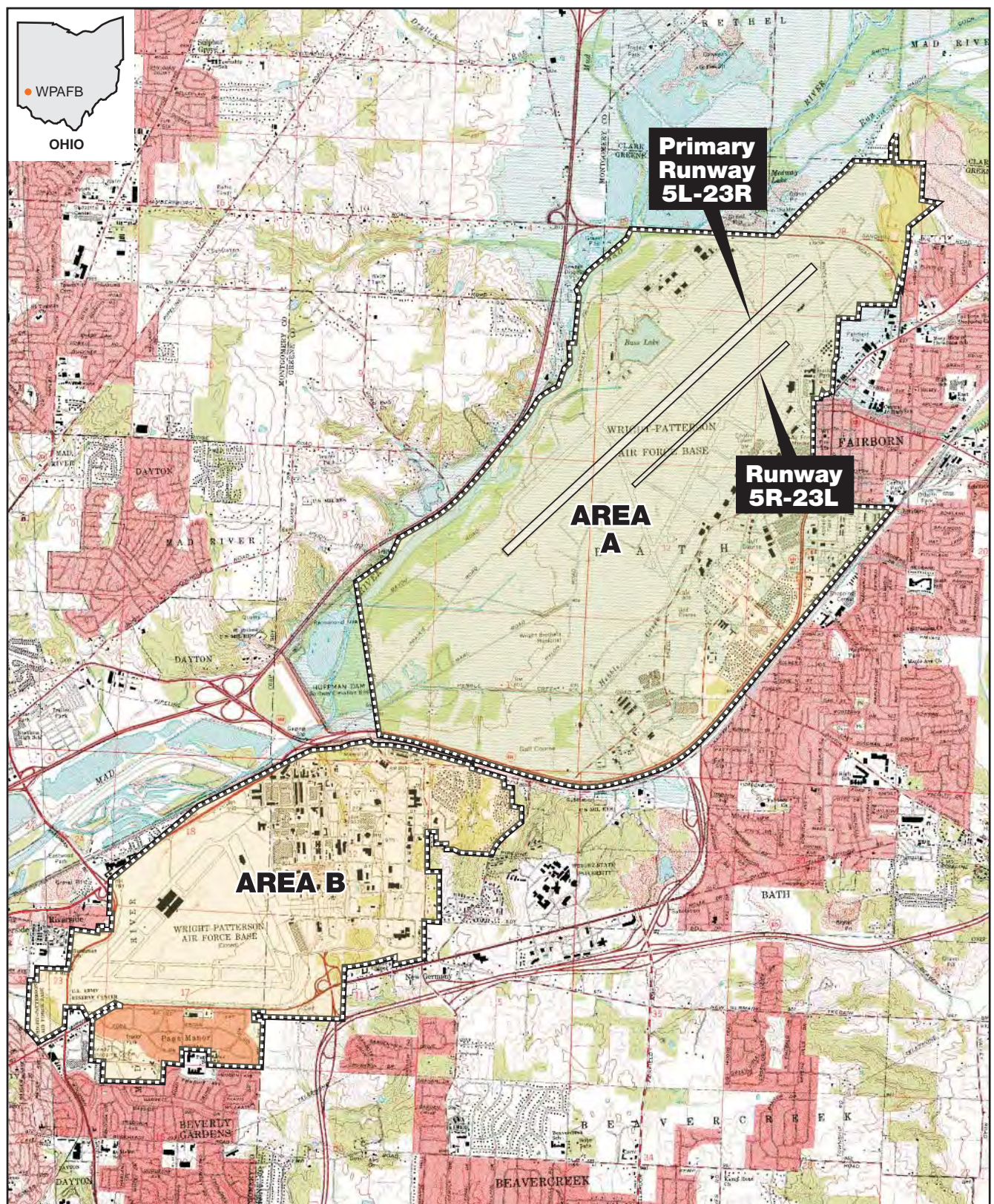
Sincerely



Darryn Warner  
Environmental Quality Section  
Asset Management Division

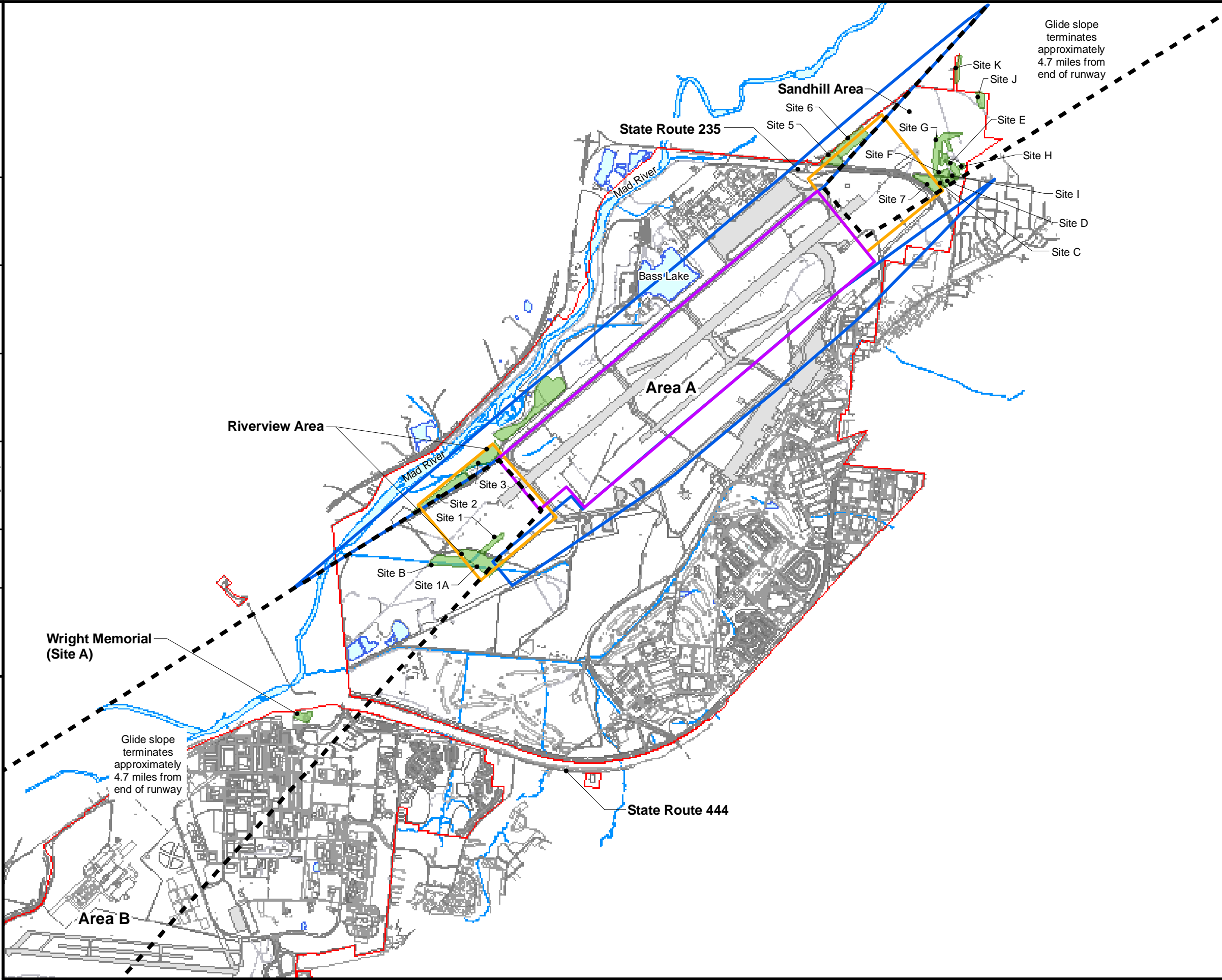
cc: Karen Beason (88 ABW/CEAOR, WPAFB)  
William H. Scoville (Shaw Environmental & Infrastructure, Inc.)

Enclosures: USGS Quadrangle Map  
GIS Figures  
2001 MCD Consultation Letters



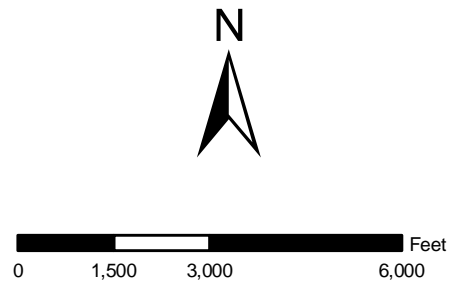
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1  
Location of WPAFB and  
Surrounding Area



**Legend**

- Glide Slope
- Primary Surface Area
- Clear Zone
- Transitional Area
- Treatment Sites
- WPAFB Base Boundary

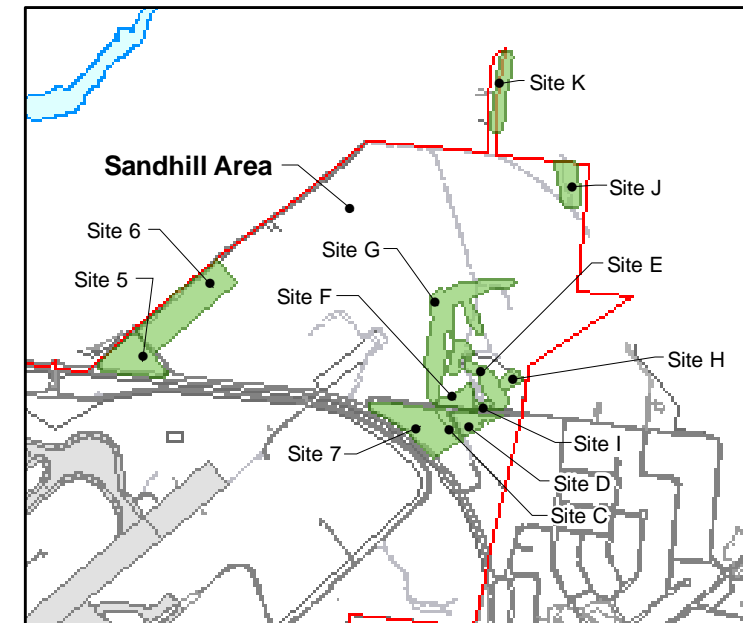


WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

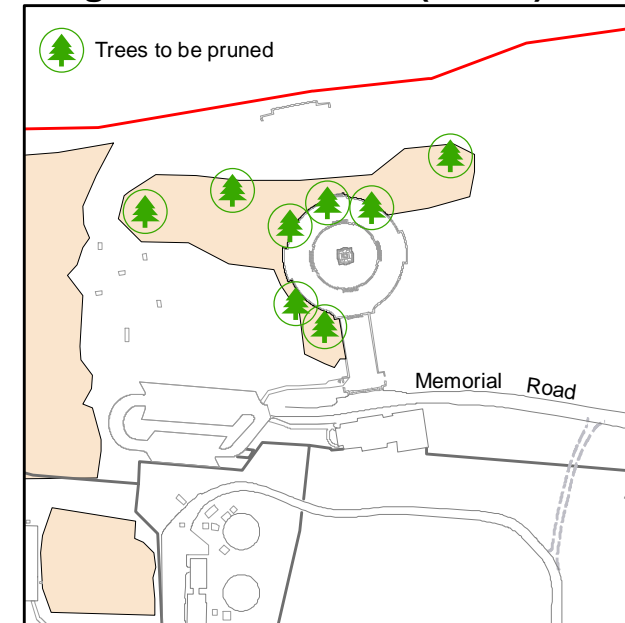
**Figure 2**

**Orientation of Clear Zone, Glide Slope,  
Transitional Area, and Primary Surface Area  
in Relationship to Vegetation Removal Areas**

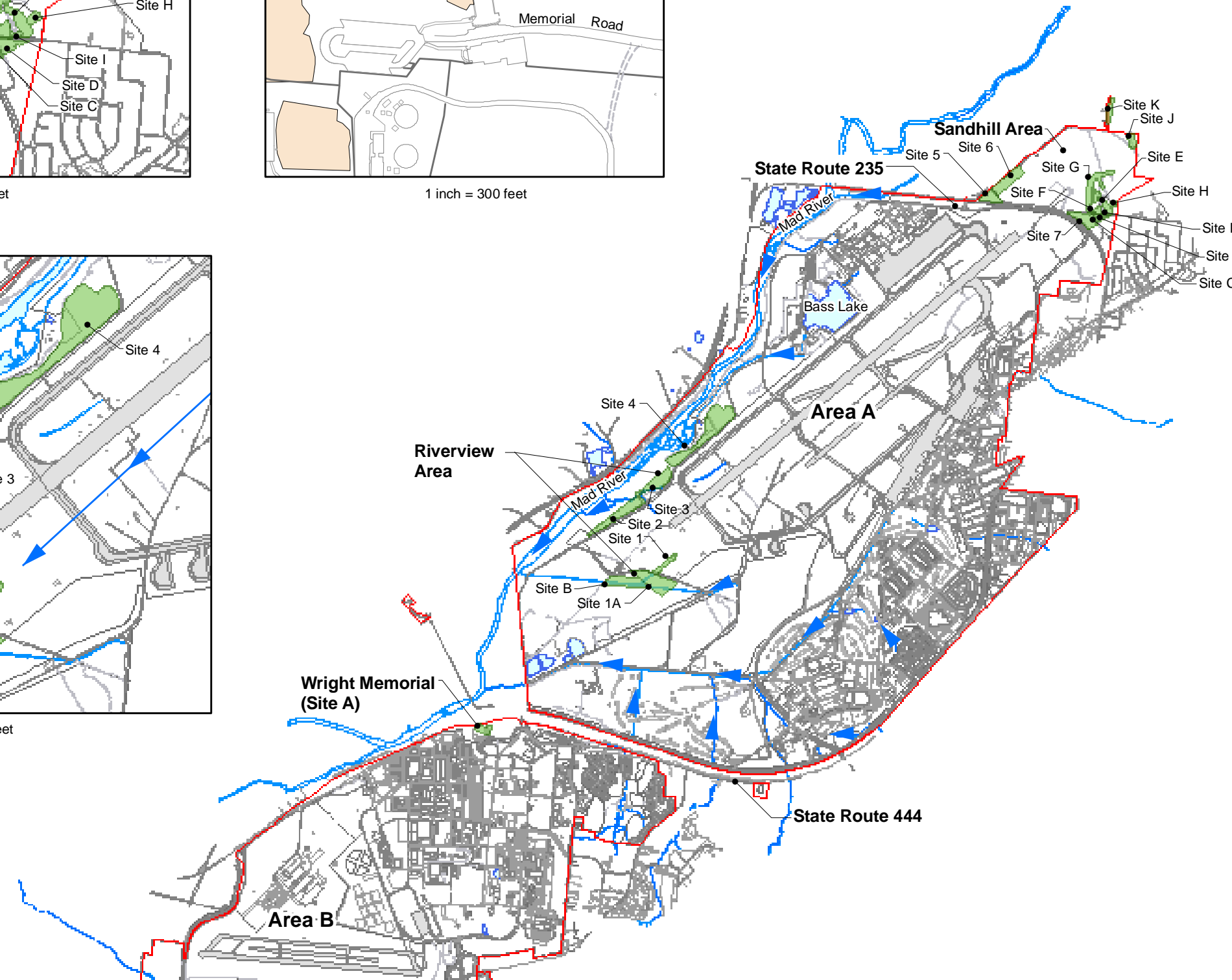
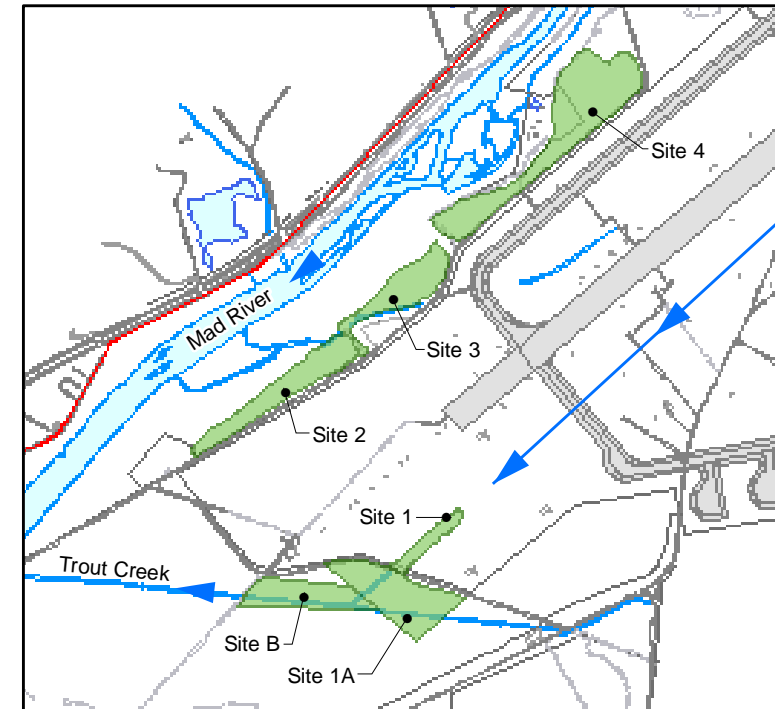
### Sandhill Area



### Wright Memorial Area (Site A)



### Riverview Area



**Legend**

- Treatment Sites
- WPAFB Base Boundary
- Existing Tree Vegetation
- Rivers or Streams
- Lakes or Ponds
- Flow Direction

WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

**Figure 3**  
**Location of Treatment Sites**



## DEPARTMENT OF THE AIR FORCE

HEADQUARTERS, 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

3 Dec 01

88 ABW/EMO  
5490 Pearson Road, Building 89  
Wright-Patterson Air Force Base, Ohio 45433-5332

Mr. Richard L. Doran  
Property Administrator  
Miami Conservancy District  
38 E. Monument Avenue  
Dayton, Ohio 45402-1271

Subject: Environmental Assessment for Removal of Glideslope and Clear Zone Obstructions,  
Wright-Patterson Air Force Base, Greene County, Ohio

Dear Sir/Madam:

Under Executive Order 11988, the U.S. Air Force is providing information to the Miami Conservancy District regarding potential floodplain impacts associated with the proposed trimming and removing of trees that cause obstructions in the glideslope and clear zone of Runways 23L/5R and 23R/5L at Wright-Patterson Air Force Base (WPAFB). Selected trees prevent adequate clearance for aircraft operations and violate AFMAN 32-1123(I). WPAFB has initiated an environmental assessment (EA) for the project in accordance with the requirements of the National Environmental Policy Act of 1969.

Woody overstory causing obstruction will be trimmed and/or removed in the locations depicted in Figures 1 and 2. The action alternatives consist of a combination of treatment techniques, which include removal of woody vegetation to ground level, variable height cutting, and pruning. The trees to be pruned are located primarily in the vicinity of the Wright Memorial. At most locations where the trees will be removed, the stumps will be left in place. For those locations where the ground will become part of a maintained lawn, the area surrounding the tree will be filled and seeded.

Areas southwest of the runways (along Riverview Road and at the end of the runways) have an average ground elevation of approximately 800 feet above mean sea level (MSL), which is within the Mad River 5-year floodplain of 801.4 ft, MSL. It is not anticipated that the tree trimming/removal program in these areas will result in the reduction of flood control capacity. The average ground elevation of the Wright Memorial and areas northeast of the runways (including Sandhill) are well above the 100-year floodplain elevation of 814.3 ft, MSL. The subject program will not effect flood control capacities in these areas.

The EA that is presently being conducted for the tree trimming/removal project will address the addition or loss of flood control capacity (if any), and the generation of any additional runoff from the new landscaping. As part of the scoping process, we would appreciate your comments regarding the level of significance that the proposed project may have on the Miami Conservancy District.

If you need further information or have comments on the proposed project, please contact me at (937) 257-5535, ext. 257. Thank you for your assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Perdue", written in a cursive style.

Thomas Perdue  
ELAP Program Manager  
Operations Branch  
Office of Environmental Management



MIAMI  
CONSERVANCY  
DISTRICT

BOARD OF DIRECTORS  
William H. Hobart  
Gayle B. Price, Jr.  
Thomas B. Rentschler  
GENERAL MANAGER  
P. Michael Robinette

December 13, 2001

Mr. Thomas Perdue  
EIAP Program Manager  
88 ABW/EMO  
5490 Pearson Road, Building 89  
Wright Patterson Air Force Base, Ohio 45433-5332

Re: Huffman Retarding Basin, Environmental Assessment for Removal of Glideslope  
and Clear Zone Obstructions

Dear Mr. Perdue:

The Miami Conservancy District staff has no objection to the proposed tree removal and pruning near the runways and at Wright Memorial providing that the following conditions are met:

1. Filling holes and site grading of areas where stumps are removed will be permitted as long as material is used from the same vicinity. No fill may be placed within the Huffman Retarding Basin below elevation 835 without prior approval from this office and a compensation agreement indicating the source of the material.
2. Trees should not be removed from the banks of the Mad River. A natural buffer strip along the river is critical to the physical and biological health of the waterways.
3. Vegetative material may be ground up or disposed of within the retarding basin. Trees and stumps that are not ground up should be cut into short pieces so they would not block the conduits of the dam if they were to float during high water events.

Thank you for providing this information to the District for review.

Very truly yours,

A handwritten signature in dark ink, appearing to read "K. Rinehart", written over the typed name.

Kurt A. Rinehart  
Assistant Chief Engineer

KAR:vlt

File Reference No. D5-330.01



MIAMI  
CONSERVANCY  
DISTRICT

BOARD OF DIRECTORS

William E. Lukens  
Gayle B. Price, Jr.  
Thomas B. Rentschler

GENERAL MANAGER

Janet M. Bly

September 8, 2011

Mr. Darryn Warner  
88 ABW/CEANQ  
1450 Littrell Road, Building 22  
Wright-Patterson AFB, OH 45433-5209

Re: Huffman Retarding Basin, WPAFB, Proposed EA for removal of Obstructions

Dear Mr. Warner:

We have reviewed the proposed project of removing obstructions within the glide slope and clear zones at WPAFB including tree removal and pruning near the runways and at Wright Memorial.

As indicated in our letter dated December 13, 2001 (copy enclosed), the Miami Conservancy District (MCD) has no objections to the proposed project; however, the three (3) conditions indicated in our previous letter will still be required.

Thank you for the opportunity to review the project and if you have any further questions please contact me at (937) 223-1278, ext. 3230.

Very truly yours,

Roxanne H. Farrier  
Property Administrator

Enclosure

cc: Kurt Rinehart

File: WPAFB

***U.S. Fish & Wildlife Service Consultation Letters:***

- 1. WPAFB Request – 13Apr11 and 3Aug12**
- 2. USFWS Response – 21Oct11 and 27Aug12**

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

13 April 2011

88 ABW/CEANQ  
1450 Littrell Road, Building 22  
Wright-Patterson AFB OH 45433-5209

Dr. Mary Knapp  
U.S. Fish and Wildlife Service  
6950 Americana Parkway, Suite H  
Reynoldsburg, OH 43068-4127

Dear Dr. Knapp:

The United States Air Force (USAF) is seeking informal consultation with the U.S. Fish and Wildlife Service (USFWS) in compliance with Section 7 of the Endangered Species Act regarding the proposal to remove obstructions in the glide slope and clear zones at Wright-Patterson Air Force Base (WPAFB). The obstructions currently prevent adequate clearance for aircraft operations, violating Air Force Manual (AFMAN) 32-1123(I). AFMAN 32-1123(I) requires the removal of airspace obstacles in order to uphold safe standards for airfields. The proposed project would allow WPAFB to continue to safely support aircraft military operations.

The USAF has initiated an Environmental Assessment (EA) for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The geographic location of the proposed project area is Greene and Clark Counties (Figure 1). The area of the proposed vegetative overstory removal/trimming is located at both ends of runways 05-23R and 05-23L and at Wright Memorial. Activities under the Proposed Action would be limited to tree trimming and removal within the glide slope, clear zones, transitional areas, and surface area at WPAFB in order to mitigate encroachment and ensure the necessary margin of safety for flight operations at WPAFB. No new facility construction or facility demolition activities are anticipated.

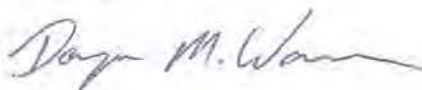
Under the Proposed Action, woody overstory causing obstructions would be trimmed and/or removed in 19 treatment sites (Figure 2) in three separate locations: Wright Memorial, Riverview, and Sandhill (Figure 3). The 19 sites total approximately 90 acres and range in size from approximately 0.2 to 16 acres. The Proposed Action involves treatment techniques (i.e., shearing, knuckle boom loader disk saw cutting, chainsaw cutting) to remove woody vegetation to ground level in the clear zone and cut to 10 feet below the approach and departure area in the glide slope. Trees to be pruned are located primarily in the vicinity of the Wright Memorial (Figure 3). Tree stumps would be left in place at most tree removal locations. For locations where the ground would become part of a maintained lawn, the area surrounding a removed tree would be filled and seeded.

Under the No Action Alternative, no removal or pruning of vegetative obstructions in the clear zone, transitional area, or glide slope would occur. Current obstructions would continue to increase as the woody overstory continues to grow, thus increasing the safety concern for aircraft and airfield operations at WPAFB.

I am requesting comment from your agency regarding the presence or absence of Federal- and state-listed species that may be located within 0.5 miles from the areas likely to be disturbed by the proposed project. WPAFB previously consulted with the USFWS regarding tree trimming and removal, requesting comments regarding the Proposed Action in a letter dated December 3, 2001 (attached). The USFWS responded in a letter dated December 20, 2001 (attached), indicating there were no existing or proposed state nature preserves or scenic rivers at the project site. The letter also indicated that the Ohio Department of Natural Resources was unaware of any unique ecological sites, geologic features, breeding or non-breeding animal concentrations, champion trees, or state parks, forests or wildlife areas in the project vicinity.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at 937/257-4857 or by email at [Darryn.Warner@wpafb.af.mil](mailto:Darryn.Warner@wpafb.af.mil).

Sincerely



Darryn Warner  
Environmental Quality Section  
Asset Management Division

cc: Karen Beason (88 ABW/CEAOR, WPAFB)  
William H. Scoville (Shaw Environmental & Infrastructure, Inc.)

Enclosures: USGS Quadrangle Map  
GIS Figure  
December 2001 Letters



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS, 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

88 ABW/EMO  
5490 Pearson Road, Building 89  
Wright-Patterson AFB, Ohio 45433-5332

03 DEC 2001

Mr. Ken Lammers, Acting Director  
U.S. Fish and Wildlife Service  
Ecological Services  
6950 Americana Parkway, Suite H  
Reynoldsburg, Ohio 43068-4132

Subject: Environmental Assessment for Removal of Glideslope and Clear Zone Obstructions,  
Wright-Patterson Air Force Base, Greene County, Ohio

Dear Mr. Lammers:

Wright-Patterson Air Force Base, located in the southwestern portion of Greene County, Ohio, is preparing an Environmental Assessment (EA) for removing glideslope and clear zone obstructions to provide adequate clearance for aircraft operations, as defined by AFMAN 32-1123(I). Woody overstory causing obstruction will be trimmed and/or removed. Three general areas to be affected include the Wright Memorial, areas southwest of the runways (including Riverview Road), and areas northeast of the runways (including Sandhill) (see Figure 1).

The action alternatives consist of a combination of treatment techniques, which include removal of woody vegetation to ground level, variable height cutting, and pruning. The trees to be pruned are located primarily in the vicinity of the Wright Memorial. At most locations where trees will be removed, the stumps will be left in place. For those locations where ground will become part of a maintained lawn, the area surrounding the tree will be filled and seeded.

I am requesting comment from your agency regarding the presence or absence of federal- and state-listed species that may be located within 0.5 miles from the areas likely to be disturbed by the project. Threatened and endangered species known to exist within the vicinity of the base include the Indiana bat (*Myotis sodalis*), bald eagle (*Haliaeetus leucocephalus*), eastern massasauga rattlesnake (*Sistrurus c. catenatus*), clubshell (*Pleurobema clava*, a mussel), and blazing star stem borer (*Papaipema beeriana*, a moth). Two Indiana bats were captured on the base in July 2000 near the intersection of Prairie Road and Symmes Road along Trout Creek. This site appears to be within one half mile of the project area.

In addition, please comment on the presence or absence of areas of ecological concern including wetlands, national wild and scenic rivers, wildlife areas, wildlife refuges, wildlife management areas, and wildlife sanctuaries that may be located within the areas likely to be disturbed by the project. The attached maps (see Figures 1 and 2) depict the locations of the proposed project areas. We have also

contacted the ODNR's Division of Natural Areas and Preserves for a search of their Natural Heritage Database.

Please return the search results to me at the address located on the letterhead. If you have any questions, please call me at 937-257-5535 ext. 257. Thank you in advance for your time.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Perdue". The signature is fluid and cursive, with the first name "Thomas" and last name "Perdue" clearly distinguishable.

Thomas Perdue  
ELAP Program Manager  
Operations Branch  
Office of Environmental Management



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Ecological Services  
6950 Americana Parkway, Suite H  
Reynoldsburg, Ohio 43068-4132

(614) 469-6923/FAX (614) 469-6919  
December 20, 2001

Thomas J. Perdue  
Office of Environmental Management  
Department of the Air Force  
Wright-Patterson AFB, OH 45433

Dear Mr. Perdue:

This is in response to your December 3, 2001 letter requesting informal consultation with us, in compliance with section 7 of the Endangered Species Act, for the proposed removal of glideslope and clear zone obstructions to provide adequate clearance for aircraft operations, as defined by AFMAN 32-1123(I). Woody overstory causing obstruction will be trimmed and/or removed. Three general areas to be affected include the Wright Memorial, areas southwest of the runways, and areas northeast of the runways on the Wright-Patterson AFB, Greene County, Ohio.

In your letter you also request our comments regarding the presence of areas of ecological concern. No national wild and/or scenic rivers, wildlife areas, refuges, or sanctuaries are located within the areas likely to be disturbed by the proposed project.

In general, we recommend that any potential projects minimize water quality impacts and impacts to high quality fish and wildlife habitat, such as forests, streams, and wetlands. If streams and/or wetlands are involved, you should contact the Regulatory Branch of the Louisville District of the Corps of Engineers and the Ohio EPA for possible Section 404/401 permit requirements. Note that wetlands may exist on sites that are not designated wetland by the National Wetland Inventory. Delineation of possible wetlands on the project site should be done by qualified consultants.

**ENDANGERED SPECIES COMMENTS:** The proposed project lies within the range of the Indiana bat (*Myotis sodalis*), a Federally listed endangered species. Summer habitat requirements for the species are not well defined but the following are thought to be of importance:

1. Dead trees and snags along riparian corridors especially those with exfoliating bark or cavities in the trunk or branches which may be used as maternity roost areas.
2. Live trees (such as shagbark hickory) which have exfoliating bark.
3. Stream corridors, riparian areas, and nearby woodlots which provide forage sites.

Considering the above items, we recommend that if trees with exfoliating bark (which could be potential roost trees) are encountered in the project area, they and surrounding trees should be saved wherever possible. If they must be cut, they should not be cut between April 15 and September 15.

If desirable trees are present and if the above time restriction is unacceptable, mist net or other surveys should be conducted to determine if bats are present. The survey should be designed and conducted in coordination with the endangered species coordinator for this office. The survey should be conducted in June or July since the bats would only be expected in the project area from approximately April 15 to September 15.

The proposed project also lies within the range of the clubshell mussel (*Pleurobema clava*), a Federally listed endangered species. Due to the project location, the project, as proposed, will have no effect on this species. Relative to the clubshell mussel, this precludes the need for further action on this project as required by the 1973 Endangered Species Act, as amended. Should the project be modified or new information become available that indicates listed or proposed species may be affected, consultation should be initiated.

The project lies within the range of the eastern massasauga (*Sistrurus catenatus catenatus*), a docile rattlesnake that is declining throughout its national range and is currently a Federal candidate species. The snake is currently listed as endangered by the State of Ohio. Your proactive efforts to conserve this species now may help avoid the need to list the species under the Endangered Species Act in the future. Due to their reclusive nature, we encourage early project coordination to avoid potential impacts to massasaugas and their habitat.

The massasauga is often found in, or near, wet areas; including wetlands, wet prairie, nearby woodland, or shrub edge habitat. This often includes dry goldenrod meadows with a mosaic of early successional woody species such as dogwood or multiflora rose. Wet habitat and nearby dry edges are utilized by the snakes, especially during the spring and fall. Dry upland areas up to 1.5 miles away are utilized during the summer, if available. Some project management ideas include the following:

- 1) At a minimum, project evaluations should contain delineations of whether or not massasauga habitat occurs within project boundaries. Descriptions should indicate the quality and quantity of massasauga habitat (holes, crayfish burrows, foraging area, or basking sites) that may be affected by the project.
- 2) In cases where massasaugas are known to occur or potential habitat is rated moderate to high, massasauga surveys may be necessary. If surveys are conducted, it may be helpful to inquire with local resource agency personnel who may know of massasauga sightings, or from reliable local residents. In addition, local herpetologists may have knowledge of historical populations, their habits, and especially the specific local habitats that may contain massasaugas. Surveys should be performed during the periods of spring emergence from dens (usually a narrow window in April or May) and should continue throughout the active season until October. This species is often easiest to locate during the summer months when pregnant females seek open areas in the early mornings, especially after cool evenings. Massasauga biologists recommend that 40 person-hours be spent at each survey locality to confirm the absence or presence of this reclusive species. Recommended survey protocol has been published and should be consulted for further details, as should local experts and literature from previous research and surveys.

Szymanski, J. A. 1998. Range-wide status assessment for the eastern massasauga (*Sistrurus c. catenatus*). U.S. Fish and Wildlife Service, Fort Snelling, MN, 31 pp. + appendix.

Casper et. al. 2000. Recommended standard survey protocol for the eastern massasauga, *Sistrurus catenatus catenatus*. Submitted to Herpetological Review, February 2000.

3) In portions of projects where massasaugas will be affected, clearing and construction activities should occur during the summer when air and ground temperatures are above 65° F. These warm season temperatures allow the snakes to be warm enough to move out of harm's way, if encountered during construction.

4) Maintenance activities (mowing, cutting, burning, etc.) should be conducted during the winter (November 1 to March 15) when snakes are hibernating or during the specified seasonal temperature periods described in the following publication:

Johnson et al. 2000. The eastern massasauga rattlesnake: a handbook for land managers. U.S. Fish and Wildlife Service, Fort Snelling, MN 55111-4056, 52 pp. + appendix.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973, as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if we may be of further assistance in this matter, please contact Ken Lammers at Extension 15 in this office.

Sincerely,



*for* Mary M. Knapp  
Supervisor

cc: ODNR, Div. of Wildlife, Environmental Section, Columbus, OH  
ODNR, Div. of Real Estate and Land Management, Columbus, OH



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE OHIO

88 ABW/EMO  
5490 Pearson Road, Building 89  
Wright-Patterson AFB, Ohio 45433-5332

09 JUL 2002

Mr. Ken Lammers  
U.S. Fish and Wildlife Service  
Ecological Services  
6950 Americana Parkway, Suite H  
Reynoldsburg, Ohio 43068-4132

Subject: Removal of Glideslope and Clear Zone Obstructions, Wright-Patterson Air Force Base

Dear Mr. Lammers:

Wright-Patterson Air Force Base (WPAFB), located in the southwestern portion of Greene County, Ohio, is preparing an Environmental Assessment (EA) to assess the effects of removing obstructions from glideslope, transitional, and clear zone areas to provide adequate clearance for aircraft operations and to protect human health and safety. Removal of airspace obstacles to uphold safe standards for airfields is required in accordance with Air Force Manual 32-1123(I). The proposed action consists of removing and pruning trees in three general areas: Wright Memorial, Riverview Road, and Sandhill (Attachment 1).

Tree clearing will remove riparian/floodplain and upland forest types. Dominant trees and shrubs in riparian/floodplain forests include boxelder, red elm, eastern cottonwood, hackberry, green ash, silver maple, black maple, black walnut, blacklocust, honey locust, yellow poplar, bitternut hickory, redbud, ironwood, amur honeysuckle, bladdernut, blackhaw, silky dogwood, common elderberry, spicebush, and sandbar willow. Dominant trees and shrubs in upland forests include sugar maple, white oak, red oak, red maple, shagbark hickory, white ash, blue ash, red elm, redbud, blacklocust, amur honeysuckle, gray dogwood, and blackhaw viburnum.

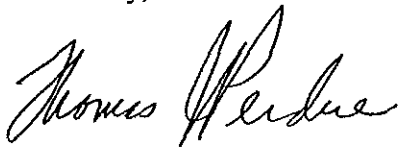
In July 2000, two Indiana bats (a juvenile female and an adult post-lactating female) were captured along Trout Creek (Attachment 1) during a base-wide mist net survey (BHE 2001). The juvenile female was captured within the glideslope area of the proposed action and the adult post-lactating female was captured beyond the limits of the proposed action, near the Mad River. Two maternity trees were identified on the grounds of Wright State University, approximately 2 miles from the areas addressed in this EA.

There are approximately 660 acres of woodlots on the entirety of WPAFB. All of these acres likely provide suitable foraging habitat, and may provide suitable roost sites. Approximately 90 acres of a total of 660 acres of forest on WPAFB would be removed by the proposed action (86% of forest cover on WPAFB would remain).

Telemetry data gathered in 2000 at WPAFB indicates the two bats used areas at and up to approximately 3 miles away from capture sites. Based upon a much more robust data set (n = 48), Garner and Gardner (1992) found reproductively active females travel an average of 0.6 miles from their capture site to roosts (Garner and Gardner 1992). Approximately 599 acres of forest cover is located within 0.6 mile (on, and off-base) of the 2000 mist net capture sites. Approximately 52 acres of the 599 acres of forest cover within 0.6 miles of capture sites would be removed, resulting in the retention of 91% of forest cover.

To avoid impacts to the Indiana bat, no trees will be removed during the summer maternity season (15 April through 15 September). We conclude the proposed project will not adversely affect the Indiana bat. The purpose of this correspondence is to request written concurrence from the U.S. Fish and Wildlife Service with our conclusion. If you have any questions or comments regarding activities described herein, please contact me at 937-257-5535 ext. 257. Thank you in advance for your time.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Perdue". The signature is fluid and cursive, with a large initial "T" and "P".

Thomas Perdue  
EIAP Program Manager  
Office of Environmental Management



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Ecological Services  
6950 Americana Parkway, Suite H  
Reynoldsburg, Ohio 43068-4127

(614) 469-6923/FAX (614) 469-6919  
August 2, 2002

Thomas J. Perdue  
Office of Environmental Management  
Department of the Air Force  
Wright-Patterson AFB, OH 45433

Dear Mr. Perdue:

This is in response to your July 9, 2002 letter requesting informal consultation under section 7(a)(2) of the Endangered Species Act, as amended (ESA) for the proposed removal of obstructions from glideslope, transitional, and clear zone areas. Such removal would provide adequate clearance for aircraft operations and to protect human health and safety, as required in accordance with Air Force Manual 32-1123(I). The proposed action consists of removing and pruning trees in three general areas: Wright Memorial, Riverview Road, and Sandhill areas of the Wright-Patterson Air Force Base (WPAFB) in the southwest portion of Greene County, Ohio. We understand no jurisdictional wetlands exist in the impact areas.

In your letter you indicate that tree clearing would remove riparian/floodplain and upland forest types. In July 2000, two Indiana bats were captured along Trout Creek during a base-wide mist net survey. Two maternity trees were identified on the grounds of Wright State University, about two miles from the areas addressed in your EA.

On July 12, 2002, biologists from my office met with Ms. Terry Lucas, who gave them a tour of the areas in question. Approximately 90 acres, of a total of 660 acres of forest on the WPAFB, would be impacted by the proposed action. Of the 599 acres of forest located within 0.6 mile from the 2000 mist net capture sites, 52 acres of forest cover would be removed. Also, to avoid direct impacts to the Indiana bat, no trees would be removed during the summer maternity season (April 15 through September 15).

Considering the above assessment and agreed upon measures, you conclude that the proposed project will not adversely affect the Indiana bat. We concur with your assessment, provided that the following comments, that were discussed in part at the July 12 meeting, are addressed. We would like to pursue a memorandum of agreement with the WPAFB (and perhaps the Miami Conservancy District, which owns forested land between WPAFB and the Mad River) in an effort to preserve the remaining Indiana bat habitat on the Base. The memorandum, which would fulfill, in part, the Air Force's section 7(a)(1) responsibilities as stated in the ESA, should include measures to enhance bat habitat. For example, dead or dying trees should be maintained rather than be removed. If the tree(s) is located in a human use area, such as a picnic area, consideration should be given to screening off the area under and near the tree with temporary fencing. Typically, dead trees provide excellent roosting habitat for several species of bats, including the Indiana bat, for a couple years, after which the quality of the habitat diminishes or ceases.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973, as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

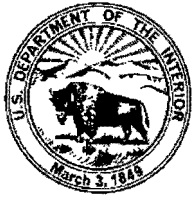
If you have questions, or if we may be of further assistance in this matter, please contact Ken Lammers at Extension 15 in this office.

Sincerely,

A handwritten signature in cursive script, appearing to read "Mary M. Knapp".

Mary M. Knapp  
Supervisor

cc: ODNR, Div. of Wildlife, SCEA Unit, Columbus, OH  
ODNR, Div. of Real Estate and Land Management, Columbus, OH



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Ecological Services  
4625 Morse Road, Suite 104  
Columbus, Ohio 43230  
(614) 416-8993 / FAX (614) 416-8994

October 21, 2011

Darryn Warner  
88 ABW/CEANQ  
1450 Littrell Road, Building 22  
Wright-Patterson AFB, OH, 45433

TAILS: 03E15000-2012-TA- 0059

Re: WPAFB Glide Slope and Clear Zones Tree Removal, Greene County, OH

Dear Mr. Warner:

This is in response to your April 13, 2011 letter received in our office September 7, 2011 requesting information we may have regarding the occurrence or possible occurrence of federally listed endangered, threatened, or candidate species within the vicinity of the proposed project located within the Wright-Patterson Air Force Base (WPAFB) in Greene County, Ohio. The Fish and Wildlife Service (Service) previously commented on this project in letters dated December 20, 2001 and February 2, 2002. In addition, the Service also attended a site visit on October 13, 2011 to look at portions of the project where tree clearing is currently proposed. We understand this project is proposing to remove obstructions in the glide slope and clear zones that prevent adequate clearance for aircraft operations. We understand that WPAFB has initiated an Environmental Assessment (EA) and that the area of the proposed vegetation overstory removal/trimming is located at both ends of the runways 05-23R and 05-23L and at Wright Memorial. According to your information activities under the proposed action would be limited to tree trimming and removal within the glide slope, clear zones, transitional areas, and surface area at WPAFB. We understand that no new facility construction or facility demolition activities are anticipated for this project.

The Service recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat, such as forests, streams, and wetlands. Best construction techniques should be used to minimize erosion, in particular, on slopes. Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted for possible need of a Section 404 permit. We support and recommend mitigation activities that reduce the likelihood of invasive plant spread and encourage native plant colonization. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats. All disturbed areas in the project vicinity should be mulched and revegetated with native plant species.

**MIGRATORY BIRD COMMENTS:** The project area lies within the range of the **bald eagle** (*Haliaeetus leucocephalus*). The bald eagle has been removed from the Federal list of endangered and threatened species due to recovery. This species continues to be afforded protection by the Bald and Golden Eagle Protection Act (BGEPA, 16 U.S.C. 668-668d) and Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703-712). There is currently a known active bald eagle located at Eastwood Metropark, located southwest of the base in Montgomery County; however, this nest is over 1.5 miles from the base.

We recommend that you contact the Ohio Department of Natural Resources, Division of Wildlife, (419) 898-0960, for the location(s) of the eagle nest(s) in the county. If any active nests are located within ½ mile of the project site, we recommend that work at the site be restricted from mid-January through July to allow pre-nesting activities, incubation, and raising of the young.

**ENDANGERED SPECIES COMMENTS:** The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

- (1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
- (2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
- (3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

We understand that the proposed action would require tree removal/trimming in 19 treatment sites in 3 locations of the base, Wright Memorial, Riverview, and Sandhill areas. According to your information, the 19 sites total approximately 90 acres of forested habitat and range in size from 0.2 to 16 acres and treatment techniques include shearing, knuckle boom loader disk saw cutting, and chainsaw to remove woody vegetation to ground level in the clear zone and cut to 10 feet below the approach and departure area in the glide slope. Based on the field site visit, the Sandhill area has previously been cleared since consultation in 2001 and consists of scattered small trees with a great deal of invasive honeysuckle. The Riverview area also has some areas that were previously cleared but also has some higher quality roosting and foraging habitat. The Memorial area has some mature trees present but none appeared to be of suitable habitat and trees in this area are only proposed to be pruned.

Mist net surveys in 2000 and 2007 detected Indiana bats within the base. A total of 6 female Indiana bats were captured along the Mad River corridor and its tributary, Trout Creek, indicating a potential maternity colony may exist on base. Based on field review of the areas proposed for tree clearing, it appears that tree clearing for the Riverview area has the highest potential to impact the Indiana bat. A number of potential roost trees were identified in this area and riparian corridors along the Mad River and Trout Creek are known foraging areas for the bat. The Service recommends the riparian corridors and adjacent trees in these areas be preserved to the maximum extent possible to protect this species and its habitat. We also recommend that these areas be trimmed instead of removing trees to the ground level, as this will preserve and may even aid in creating habitat trees in some areas for the bat. The Service

strongly recommends that the riparian areas be preserved along these waterways as captures have documented Indiana bats using this habitat for foraging and/or roosting. In addition preserving an adequate buffer along the stream will help to stabilize banks and preserve water quality. We recommend that any areas that are cleared of trees be treated for invasive species to maintain quality habitat on the base. Any trees proposed to be removed/trimmed should only be conducted from September 30-April 1, when bats would not be present. Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The project lies within the range of the **eastern massasauga** (*Sistrurus catenatus*), a small, docile rattlesnake that is currently a Federal candidate species. Since designated as a candidate species in 1999, it has declined significantly throughout its range and populations in Ohio that were once throughout glaciated portions of the state, are now small and isolated. The species has been listed by the State of Ohio as endangered since 1996. Several factors have contributed to the decline of the species including habitat loss and fragmentation, indiscriminate killing, collection, gene pool contamination and incompatible land use practices.

Eastern massasaugas use both upland and wetland habitat and these habitats differ by season. During the winter, massasaugas hibernate in low wet areas, primarily in crayfish burrows, but may use other structures. Presence of a water table near the surface is important for a suitable hibernaculum. In the summer, massasaugas use drier, open areas that contain a mix of grasses and forbs such as goldenrods and other prairie plants that may be intermixed with trees or shrubs. Adjoining lowland and upland habitat with variable elevations between are critical for the species to travel back and forth seasonally. The eastern massasauga is potentially present at WPAFB with records from the Prime BEEF Training Area (PBTA) and Twin Base Golf Course (TBGC). Although the last documented record was from 1993 in the PBTA, recent base wide survey efforts have been ongoing to try to detect the presence or probable absence of the species within the base. Most of the areas proposed to be impacted for this project have been previously disturbed and do not contain suitable habitat. Based on field site review, Site 1A near Trout Creek appeared to have potential habitat for the species and we understand surveys have been conducted there previously. The Service recommends that project related activities within suitable habitat for the species be restricted to November 15-March 1, when snakes would be dormant. Should the proposed project area contain any of the habitat types or features described above, we recommend that a habitat assessment be conducted to determine if suitable habitat for the species exists within the vicinity of the proposed site. Please note that habitat assessments should only be conducted by approved eastern massasauga surveyors due to variable habitat types and cryptic nature of the species. Any habitat assessments or surveys should be coordinated with this office.

The proposed project lies within the range of the **clubshell** (*Pleurobema clava*), a federally listed endangered freshwater mussel. The clubshell inhabits areas with sand or gravel substrate and also prefers areas with riffles and runs. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the clubshell in the vicinity of the proposed site. The clubshell is potentially present in the Little Miami River and drainages where preferred habitat exists. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have valid Federal and State permits to survey for federally listed mussels in Ohio.

The proposed project lies within the range of the **snuffbox** (*Epioblasma triquetra*), a freshwater mussel that is currently proposed for listing as federally endangered. The snuffbox occurs in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. The snuffbox is known to be present in the Stillwater and Little Miami River and drainages where preferred habitat exists. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the snuffbox in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The proposed project lies within the range of the **rayed bean** (*Villosa fabalis*), a freshwater mussel that is currently proposed for listing as federally endangered. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). The rayed bean is known to be present in the Great Miami River and is potentially present in perennial streams in Green and Montgomery County where preferred habitat exists. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of rayed bean mussels in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed ESA section 7 consultation document.

If you have questions, or if you would like to set up a site visit, please contact Melanie Cota at extension 15 in this office or by email at [Melanie\\_Cota@fws.gov](mailto:Melanie_Cota@fws.gov) or visit our website at <http://www.fws.gov/midwest/Ohio>.

Sincerely,



Mary Knapp, Ph.D.  
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

03 August 2012

88 ABW/CEANQ  
1450 Littrell Road, Building 22  
Wright-Patterson AFB OH 45433-5209

Dr. Mary Knapp  
U.S. Fish and Wildlife Service  
Ecological Services  
4625 Morse Road, Suite 104  
Columbus OH 43230

RE: Informal Section 7 Consultation, Glide slope and Clear Zone, Area A, Wright-Patterson AFB Ohio

Dear Dr. Knapp

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Assessment in accordance with the requirements of the National Environmental Policy Act of 1969 to address environmental impacts associated with the removal of obstructions in the glide slope and clear zones at Wright-Patterson Air Force Base (WPAFB). The geographic location of the proposed project area is Greene and Clark Counties (Figure 1). The obstructions currently prevent adequate clearance for aircraft operations, violating Air Force Manual (AFMAN) 32-1123(I). AFMAN 32-1123(I) requires the removal of airspace obstacles in order to uphold safe standards for airfields. The proposed project would allow WPAFB to continue to safely support military aircraft operations. By way of this letter, WPAFB is seeking informal Section 7 consultation for the proposed project actions. The following species are considered to be in the range of the proposed project area:

1. Bald eagle (*Haliaeetus leucocephalus*), protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act
2. Indiana bat (*Myotis sodalists*), a federally endangered species
3. Eastern massasauga rattlesnake (*Sistrurus catenatus*), a federal candidate species
4. Clubshell mussel (*Pleurobema clava*), a federally endangered species
5. Snuffbox mussel (*Epioblasma triquetra*), a species proposed for listing as federally endangered
6. Rayed bean mussel (*Villosa fabalis*), a species proposed for listing as federally endangered

**Proposed Action**

Under the Proposed Action, woody overstory causing obstructions would be trimmed and/or removed in 19 treatment sites (Figure 2) in three separate locations: Wright Memorial, Riverview, and Sandhill (Figure 3). The 19 sites total approximately 90 acres and range in size from approximately 0.2 to 16 acres. The Proposed Action involves treatment techniques (i.e., shearing, knuckle boom loader disk saw cutting, chainsaw cutting) to remove woody vegetation to ground level in the clear zone and cut to 10

feet below the approach and departure area in the glide slope. Trees to be pruned are located in the vicinity of the Wright Memorial, the riparian corridor at the south end of the runway, and along Riverview Road (Figure 3). The Sandhill Area (Figure 3) is the only area requiring tree removal. For locations where the ground would become part of a maintained lawn, the area surrounding a removed tree would be filled and seeded.

WPAFB is requesting concurrence that the proposed action would have no effect and may affect, not likely to adversely affect the 6 species as described below.

- The bald eagle is protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The nearest bald eagle nest is over 1.5 miles from the base. While suitable habitat may be present within WPAFB, this habitat is not within the areas proposed to be impacted and the proposed project areas are not located within ½ mile of any known eagle nesting site; therefore, WPAFB has determined the proposed project may affect, not likely to adversely affect the bald eagle.
- The Indiana bat is a federally endangered species. Mist net surveys in 2000, 2007 and 2012 detected Indiana bats within the base. Summer habitat requirements for the species are not well defined but the following are considered important:
  - (1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
  - (2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
  - (3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

The WPAFB Integrated Natural Resources Management Plan previously identified the wooded areas within the project area as potentially suitable roosting habitat for Indiana bats. The following impact and minimization measures would be implemented: Tree clearing only during the time period of 30 September through 1 April and pruning to the maximum extent possible instead of full tree removal. Based on the above avoidance and minimization measures, WPAFB has determined the proposed project may affect, not likely to adversely affect the Indiana bat.

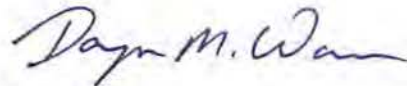
- Eastern massasauga rattlesnake is a federal candidate. The eastern massasauga is potentially present at WPAFB with records from the Warfighter Training Center (formerly Prime BEEF Training Area) and Twin Base Golf Course. Although the last documented record was from 1993 in the Warfighter Training Center, recent base wide survey efforts have been ongoing to try to detect the presence or probable absence of the species within the base. Eastern massasaugas use both upland and wetland habitat and these habitats differ by season. During the winter, massasaugas hibernate in low wet areas, primarily in crayfish burrows, but may use other structures. Presence of a water table near the surface is important for a suitable hibernaculum. In the summer, massasaugas use drier, open areas that contain a mix of grasses and forbs such as goldenrods and other prairie plants that may be intermixed with trees or shrubs. Adjoining lowland and upland habitat with variable elevations between are critical for the species to travel back and forth seasonally. As currently proposed, only a relatively small portion of the project area is considered to be potential eastern massasauga habitat and that particular area will only receive tree pruning. Thus no ground disturbing activities will take place; therefore, WPAFB has determined the proposed project may affect, not likely to adversely affect the eastern massasauga.

- Clubshell is a federally listed endangered freshwater mussel. Neither the species nor the habitat exists within the proposed project area. The clubshell inhabits areas with sand or gravel substrate and also prefers areas with riffles and runs. The clubshell is potentially present in the Little Miami River and drainages where preferred habitat exists. As currently proposed, no streams will be disturbed and/or impacted; therefore, WPAFB has determined there would be no effect on the clubshell from the Proposed Action.
- Snuffbox is a federally listed endangered freshwater mussel. Neither the species nor the habitat exists within the proposed project area. The snuffbox occurs in swift currents of riffles and shoals over sand and gravel with occasional cobble and boulders. The snuffbox is known to be present in the Stillwater and Little Miami Rivers and drainages where preferred habitat exists. As currently proposed, no streams will be disturbed and/or impacted; therefore, WPAFB has determined there would be no effect on the snuffbox from the Proposed Action.
- Rayed bean is a federally listed freshwater mussel. Neither the species nor the habitat exists within the proposed project area. The rayed bean is generally known from smaller headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include sand and gravel, and are often associated with, and buried under the roots of, vegetation, including the water willow (*Justica americana*) and water milfoil (*Myriophyllum* sp.). The rayed bean is known to be present in the Great Miami River and is potentially present in perennial streams in Greene and Montgomery Counties where preferred habitat exists. As currently proposed, no streams will be disturbed and/or impacted; therefore, WPAFB has determined there would be no effect on the rayed bean from the Proposed Action.

For these reasons, we conclude that the removal of obstructions in the glide slope and clear zones at Wright-Patterson Air Force Base (WPAFB), Montgomery County, Ohio would have no effect on the clubshell mussel, snuffbox mussel, and rayed bean mussel and may affect, not likely to adversely affect the bald eagle, Indiana bat, and eastern massasauga. We request concurrence with our determinations.

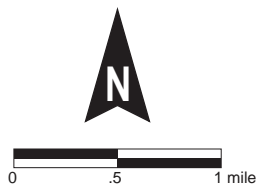
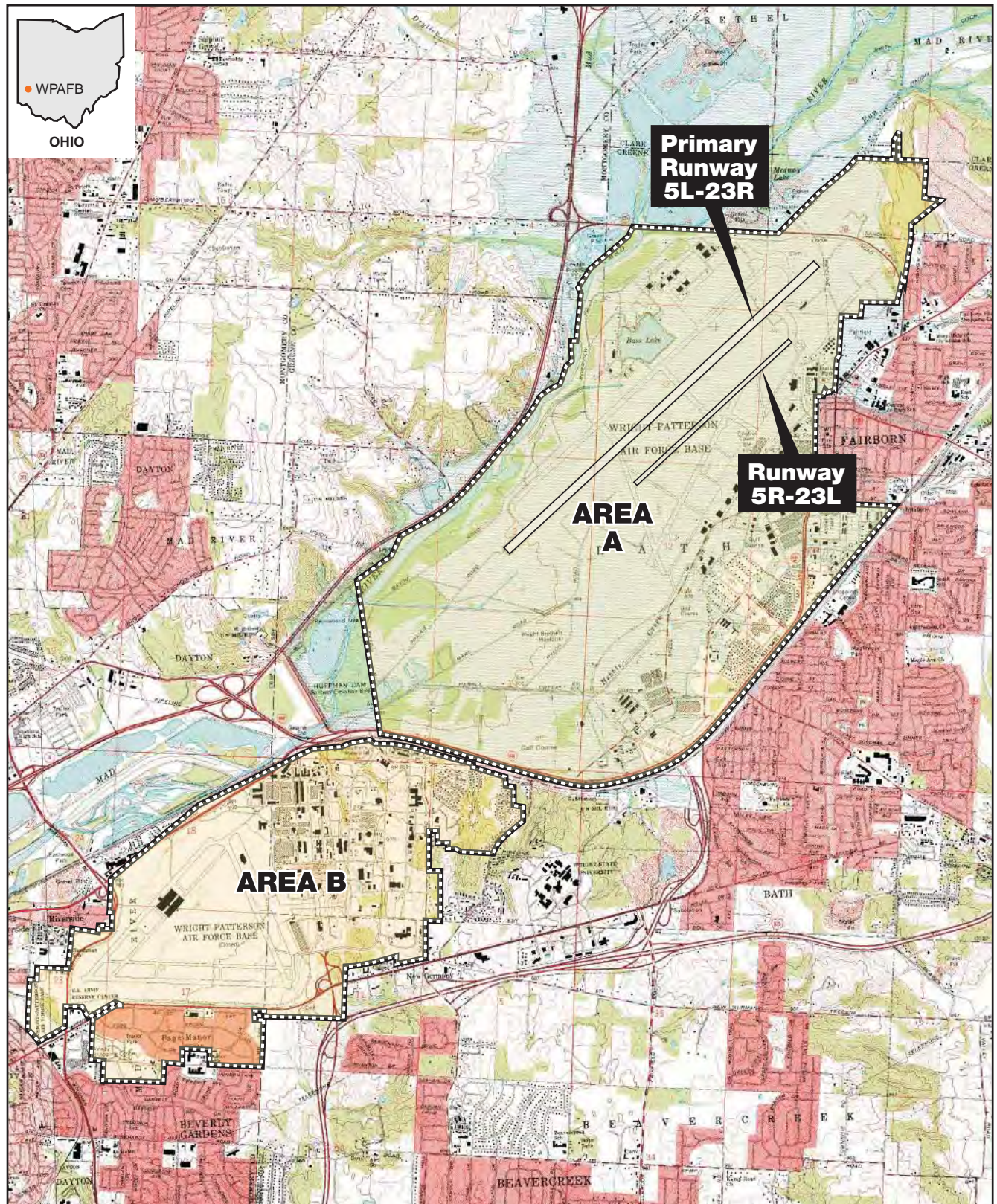
Thank you for your consideration. If you have any questions, please contact me at (937) 257-4857 or by email at [Darryn.Warner@wpafb.af.mil](mailto:Darryn.Warner@wpafb.af.mil).

Sincerely



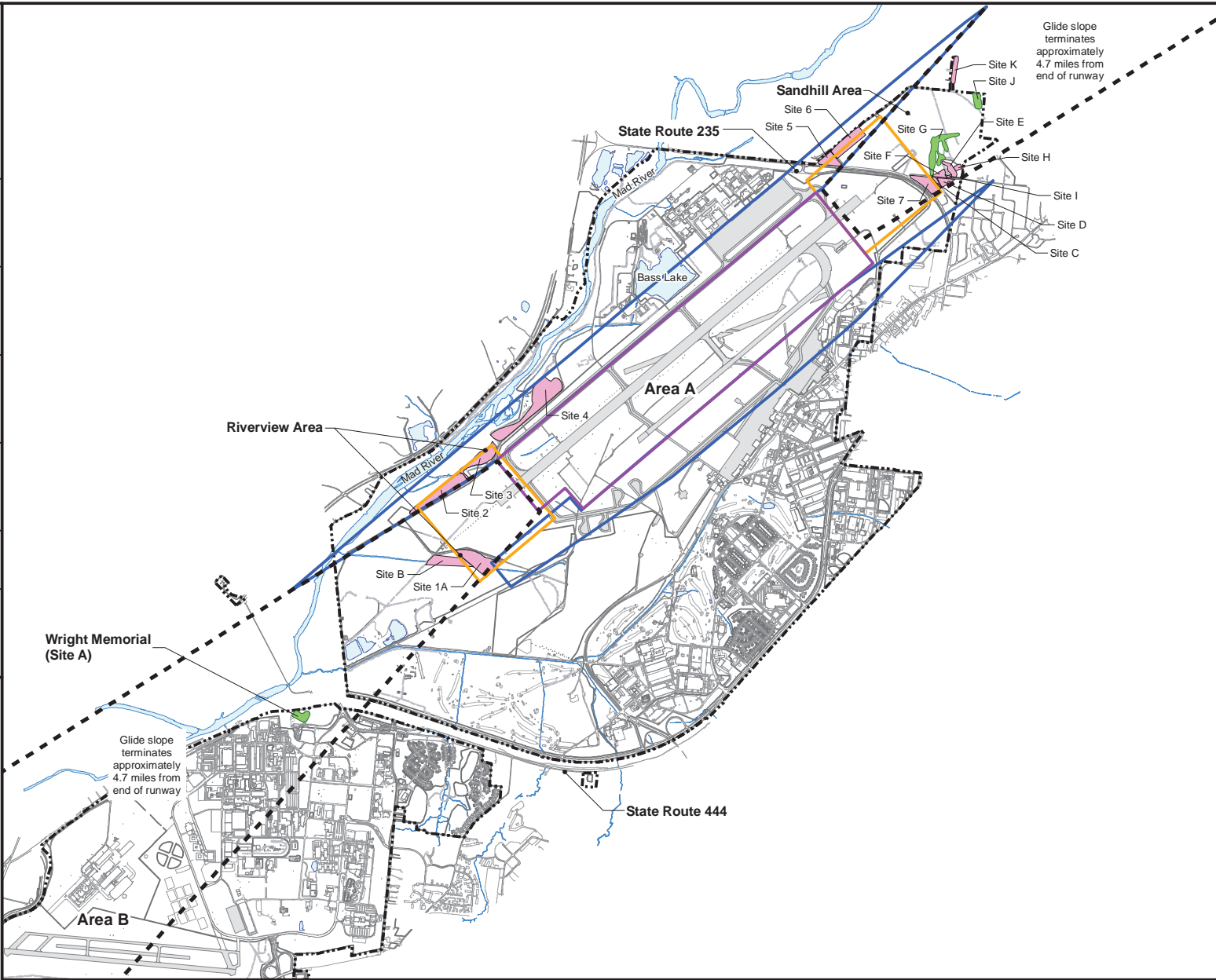
DARRYN M. WARNER  
Natural Resources Program Manager  
Environmental Quality Section

Attachment:  
Figures 1-3



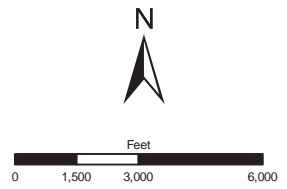
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1  
Location of WPAFB and  
Surrounding Area



**Legend**

- WPAFB Base Boundary
- Glide Slope
- Primary Surface Area
- Clear Zone
- Transitional Area
- Sites A, G, & J = Prune Only; Maximum Height 50 feet
- Sites B, C, D, E, F, H, I, K, 1A, 2, 3, 4, 5, 6, & 7 = Remove to Ground Level



WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

**Figure 1-2**

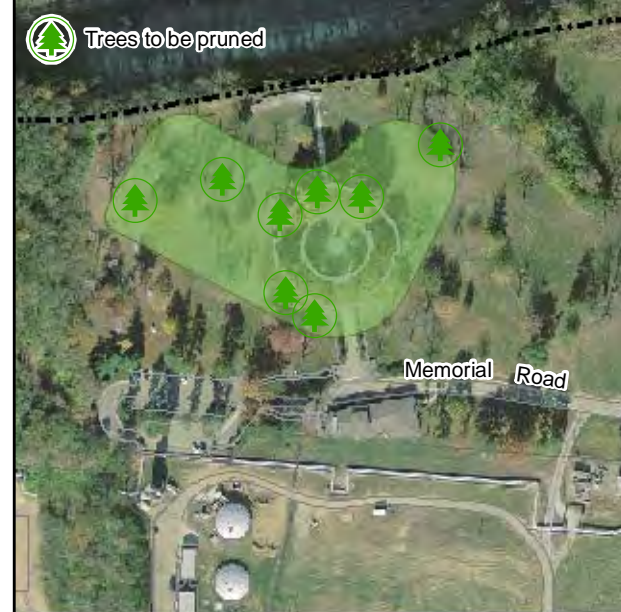
Orientation of Clear Zone, Glide Slope, Transitional Area, and Primary Surface Area in Relationship to Vegetation Removal Areas

### Sandhill Area



1 inch = 2,000 feet

### Wright Memorial Area (Site A)

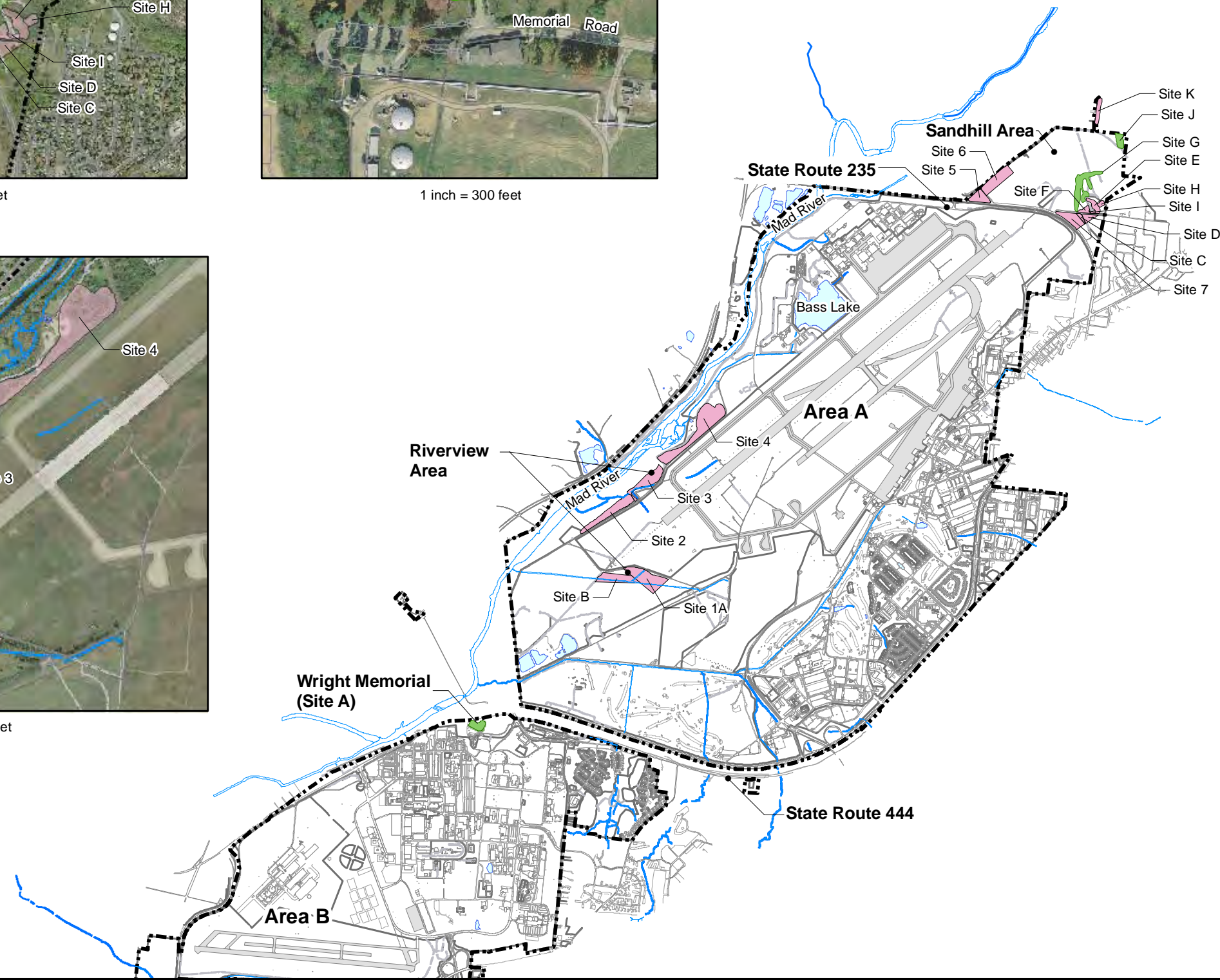


1 inch = 300 feet

### Riverview Area

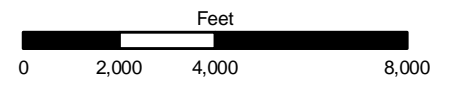


1 inch = 2,000 feet



### Legend

- Rivers or Streams
- Sites A, G, & J = Prune Only; Maximum Height 50 feet
- Sites B, C, D, E, F, H, I, K, 1A, 2, 3, 4, 5, 6, & 7 = Remove to Ground Level
- WPAFB Base Boundary
- Lakes or Ponds



WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

**Figure 1-3**  
**Location of Treatment Sites**



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Ecological Services  
4625 Morse Road, Suite 104  
Columbus, Ohio 43230  
(614) 416-8993 / FAX (614) 416-8994

August 27, 2012

Darryn Warner  
Natural Resources Program Manager  
Environmental Quality Section  
88 ABW/CEANQ  
1450 Littrell Road, Building 22  
Wright-Patterson Air Force Base, Ohio 45433-5209

Dear Mr. Warner:

TAILS #: 03E15000-2012-I-1260

This is in response to your August 3, 2012 letter requesting consultation with the U.S. Fish and Wildlife Service (Service) under the Endangered Species Act of 1973, as amended regarding the proposed Glide Slope and Clear Zone activities at Wright-Patterson Air Force Base (WPAFB).

WPAFB is proposing to remove obstructions in the glide slope and clear zones in Area A. The obstructions currently prevent adequate clearance for aircraft operations, violating Air Force Manual (AFMAN) 32-1123(I). AFMAN 32-1123(I) requires the removal of airspace obstacles in order to uphold safe standards for airfields. Woody overstory causing obstructions would be trimmed and/or removed in 19 treatment sites in 3 separate locations: Wright Memorial, Riverview, and Sandhill. The 19 sites associated with this project total approximately 90 acres and range in size from approximately 0.2 to 16 acres. Multiple treatment techniques will be utilized including shearing, knuckle boom loader disk saw cutting, and chainsaw cutting to remove woody vegetation to ground level in the clear zone and cut to 10 feet below the approach and departure area in the glide slope. Trees to be pruned are located in the vicinity of the Wright Memorial, the riparian corridor at the south end of the runway, and along Riverview Road. The Sandhill area is the only area requiring tree removal.

There are no Federal wilderness areas, wildlife refuges, or designated critical habitat within the vicinity of the proposed site.

We have reviewed the proposed project and concur with your determination that the proposed activities are not likely to adversely affect the federally listed endangered **Indiana bat** (*Myotis sodalis*), and the **eastern massasauga** (*Sistrurus catenatus*), a federal candidate species. Our concurrence is based on the following:

**Indiana bat** – WPAFB is proposing to utilize pruning to the maximum extent possible to avoid full tree removal. Any unavoidable tree removal will be conducted only after September 30 and before April 1 to avoid impacting roosting bats. Therefore, we concur with your determination that the proposed action is not likely to adversely affect the Indiana bat.

**Eastern massasauga** – Only a relatively small portion of the project area is considered to be potential eastern massasauga habitat and that particular area will only receive tree pruning. Thus, no ground disturbing activities will take place. Therefore, we concur with your determination that the proposed action is not likely to adversely affect the eastern massasauga.

The proposed project lies within the range of the federally listed endangered **clubshell** (*Pleurobema clava*), **rayed bean** (*Villosa fabalis*), and **snuffbox** (*Epioblasma triquetra*). Due to the project type, size, and location, the project, as proposed, should not impact these species.

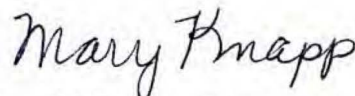
#### BALD EAGLE COMMENTS

The project lies within the range of the **bald eagle** (*Haliaeetus leucocephalus*). Bald eagles are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), and are afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, BGEPA). The proposed work is not within ½ mile of a bald eagle nest. Therefore, we agree with your assessment that the proposed action is not likely to adversely affect any bald eagles.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This concludes consultation on this action as required by section 7(a)(2) of the Endangered Species Act. Should, during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be reinitiated to assess whether the determinations are still valid.

If you have questions, or if we may be of further assistance in this matter, please contact Angela Boyer at extension 22 in this office.

Sincerely,



Mary M. Knapp, Ph.D.  
Field Supervisor

cc: ODNr, DOW, SCEA Unit, Columbus, Ohio

***Ohio Department of Natural Resources Consultation Letters:***

- 1. Shaw Request – 12Apr11**
- 2. ODNR Response – 19Apr11**



Shaw Environmental, Inc.

Shaw Environmental, Inc.

5050 Section Avenue  
Cincinnati, OH 45212-2025  
513.782.4700  
Fax: 513.782.4807

April 12, 2011

Ms. Debbie Woischke  
Ohio Department of Natural Resources  
Division of Wildlife  
Ohio Biodiversity Database Program  
2045 Morse Road, Building G-3  
Columbus, Ohio 43229-6693

Subject: Rare Species Data Request and Informal Consultation  
Environmental Assessment of Land Access within the Glide Slope Corridor  
Wright-Patterson Air Force Base, Ohio

Dear Ms. Woischke:

The purpose of this letter is to request information from the National Heritage Program for State and Federally-listed threatened or endangered plants and animals in the vicinity of the West Ramp at Wright-Patterson Air Force Base (WPAFB). The United States Air Force (USAF) is proposing to remove glide slope and clear zone obstructions in order to provide adequate clearance for aircraft operations.

We are currently preparing an Environmental Assessment (EA) under contract to WPAFB, which will address potential impacts associated with removing obstructions in the glide slope and clear zones of three separate areas at WPAFB: Wright Memorial, Riverview, and Sandhill. The intent of the EA is to satisfy requirements under the National Environmental Policy Act of 1969. We are requesting the locations of known populations of rare, threatened, and endangered species within a one-mile radius of the project areas as part of this assessment. For the Indiana bat, we are requesting information within a five-mile radius of each project area. We would also like to request informal consultation regarding possible impacts of this proposed project on species listed as threatened or endangered in accordance with Section 7 of the Endangered Species Act.

The geographic location of the proposed project area is Greene and Clark Counties (Figure 1). The Proposed Action involves trimming and removing trees in 19 areas that are causing obstructions in the glide slope and clear zones of Runways 05-23R and 05-23L at WPAFB (Figures 1 and 2). A field reconnaissance indicated these areas violate height restrictions, obstruct aircraft operations, and pose danger to human health and safety. The 19 areas total approximately 90 acres and range in size from approximately 0.2 to 16 acres. The obstructions currently prevent adequate clearance for aircraft operations, violating Air Force Manual (AFMAN) 32-1123(I). AFMAN 32-1123(I) requires the removal of airspace obstacles in order to uphold safe standards for airfields. The proposed project would allow WPAFB to continue to safely support aircraft military operations.

The Proposed Action alternatives include treatment techniques (i.e., shearing, knuckle boom loader disk saw cutting, chainsaw cutting) to remove woody vegetation to ground level in the clear zone and cut to 10 feet below the approach and departure area within the glide slope. Trees proposed for pruning are located primarily in the vicinity of Wright Memorial (Figure 3). Tree stumps would be left in place at most tree removal locations. For locations where the ground would become part of a maintained lawn, the area surrounding the removed tree would be filled and seeded.

Under the No Action Alternative, no removal or pruning of vegetative obstructions in the clear zone, transitional area, or glide slope would occur. Current obstructions would continue to increase as the woody overstory continues to grow, thus increasing the safety concern for aircraft and airfield operations at WPAFB.

The Department of the Air Force, 88<sup>th</sup> Air Base Wing, WPAFB, previously consulted with the ODNR regarding the Proposed Action of tree trimming and removal. WPAFB requested comments from the ODNR regarding the Proposed Action in a letter dated December 6, 2001 (attached). The ODNR responded in a letter dated December 18, 2001 (attached), indicating there were no existing or proposed state nature preserves or scenic rivers at the project site. The letter also indicated that the ODNR was unaware of any unique ecological sites, geologic features, breeding or non-breeding animal concentrations, champion trees, or state parks, forests or wildlife areas in the project vicinity.

The Data Request Form is attached. We would appreciate any information from your database that applies to our project area. Please let us know if you concur with the no effect determination. Please contact me at 513/782-4964 or by email at [William.Scoville@shawgrp.com](mailto:William.Scoville@shawgrp.com) if you have any questions. Thank you for your consideration.

Sincerely,

SHAW ENVIRONMENTAL & INFRASTRUCTURE, INC.



William H. Scoville  
Program Manager

cc: K. Beason (88 ABW/CEAOR, WPAFB)

Enclosures:   USGS Quadrangle Map  
                  GIS Figure  
                  Threatened & Endangered Species/Wetlands Map  
                  December 2001 Letters  
                  Ohio Biodiversity Database Program Data Request Form

## DATA REQUEST FORM

OHIO DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF WILDLIFE  
OHIO BIODIVERSITY DATABASE PROGRAM  
2045 MORSE RD., BLDG. G-3  
COLUMBUS, OHIO 43229-6693  
PHONE: 614-265-6452; FAX: 614-267-3096

### **INSTRUCTIONS:**

Please complete both sides of this form, sign and return it to the address or fax number given above along with: **(1)** a brief letter describing your project, and **(2)** a map detailing the boundaries of your project site. A copy of the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly. If you fax in your request you do not need to mail the original unless otherwise requested.

### **FEES:**

As of June 2010, we have temporarily suspended charging a fee until a review of the data request process has been completed.

**WHAT WE PROVIDE:** The Biodiversity Database is the most comprehensive source of information on the location of Ohio's rare species and significant natural features. Records for the following will be provided: plants and animals (state and federal listed species), high quality plant communities, geologic features, breeding animal concentrations and unprotected significant natural areas. We also provide locations for managed areas including federal, state, county, local and non-profit sites, as well as state and national scenic rivers. A minimum one mile radius around the project site will automatically be searched. Because the data is sensitive information, it is our policy to provide only the data needed to complete your project.

\*\*\*\*\*

Date: April 12, 2011

Company name: Shaw Environmental & Infrastructure, Inc.

Name of person response letter should be addressed to: Mr. X Ms.

William H. Scoville, Program Manager

Address: 5050 Section Avenue

City/State/Zip: Cincinnati, Ohio 45212-2025

Phone: 513/782-4964 Fax: 513/782-4663

E-mail address: William.Scoville@shawgrp.com

Project Name: Environmental Assessment, Removal of Obstructions in the Glide Slope and Clear Zones at Wright-Patterson AFB, Ohio

Project Number: \_\_\_\_\_

Project Site Address: Runways 5L-23R and 5R-23L in Area A, Wright-Patterson Air Force Base

Project County: Greene

Project City/Township: Fairborn / Mad River

Project site is located on the following USGS 7.5 minute topographic quad(s): \_\_\_\_\_

Fairborn and Dayton North

Description of work to be performed at the project site: Woody overstory trimming and/or removal within the glide slope, clear zones, transitional areas, and surface area at WPAFB. Treatment techniques would include removing woody vegetation to ground level, variable height cutting, and pruning.

How do you want your data reported? (Both formats provide exactly the same data. The only difference is in the format of our response. The manual search is most appropriate for small scale projects or for those who do not have GIS capabilities. Please choose only one option.)

Printed list and map (manual search) ☒ **OR** GIS shapefile (computer search) \_\_\_\_\_

Additional information you require: For the Indiana bat, include information with a five-mile radius.

How will the information be used? The name, status and location of each species will be published in an environmental assessment that is being performed to satisfy requirements under the National Environmental Policy Act (NEPA).

I certify that data supplied by the Ohio Biodiversity Database Program will not be published without crediting the ODNR Division of Wildlife as the source of the material. In addition, I certify that electronic datasets will not be distributed to others without the consent of the Division of Wildlife, Ohio Biodiversity Program.

Signature

W. H. Search

Date: April 12, 2011



December 6, 2001

Ms. Debbie Woischke  
Ohio Department of Natural Resources  
Division of Natural Areas and Preserves  
1889 Fountain Square Court, F-1  
Columbus, OH 43224

**Re: Natural Heritage Database Search for removal of glideslope and clear zone obstructions,  
Wright-Patterson Air Force Base, Greene County, Ohio**

Dear Ms. Woischke:

Wright-Patterson Air Force Base, located in the southwestern portion of Greene County, Ohio, is conducting an Environmental Assessment to remove glideslope and clear zone obstructions to provide adequate clearance for aircraft operations. Woody overstory causing obstruction will be trimmed and/or removed. The action alternatives contain a combination of treatment techniques, which include removal of woody vegetation to ground level, variable height cutting, and pruning. As shown in Figure 1, three general areas to be affected include the Wright Memorial, areas southwest of the runways (including Riverview Road), and areas northeast of the runways (including Sandhill).

I would like to request a Natural Heritage database search for federally- and state-listed species within 0.5 mile either side of the proposed project areas and solicit other areas of concern you may have with this action. The project areas are depicted on the attached 7.5 minute USGS topographic map (Figure 2). If you have any questions, please call me at 513-326-1163. Thank you in advance for your time.

Sincerely,

**BHE ENVIRONMENTAL, INC.**

Craig A. Straub, Ph.D.  
Associate Director, NEPA/Natural Resources Group

cc: Thomas Perdue, 88 ABW/EMO, WPAFB



# Ohio Department of Natural Resources

BOB TAFT, GOVERNOR

SAMUEL W. SPECK, DIRECTOR

## Division of Natural Areas and Preserves

*Stuart Lewis, Chief*

1889 Fountain Square, Bldg. F-1

Columbus, OH 43224-1388

Phone: (614) 265-6453; Fax: (614) 267-3096

December 18, 2001

Craig Straub  
BHE Environmental, Inc.  
11733 Chesterdale Road  
Cincinnati, OH 45246-3405

Dear Mr. Straub:

I have reviewed our Natural Heritage maps and files for the Wright-Patterson Air Force Base Glideslope EA project area, including a half mile radius, on the Fairborn and Dayton North Quads in Greene and Montgomery counties (#1014.004). The numbers on the attached list correspond to the symbols marked in red on the accompanying maps. A circle represents an exact location, a triangle a general location within a square mile, and a square a general location within greater than a square mile. Exactness is determined by the accuracy and detail of information provided by the surveyor. Common name, scientific name and status are given for each species.

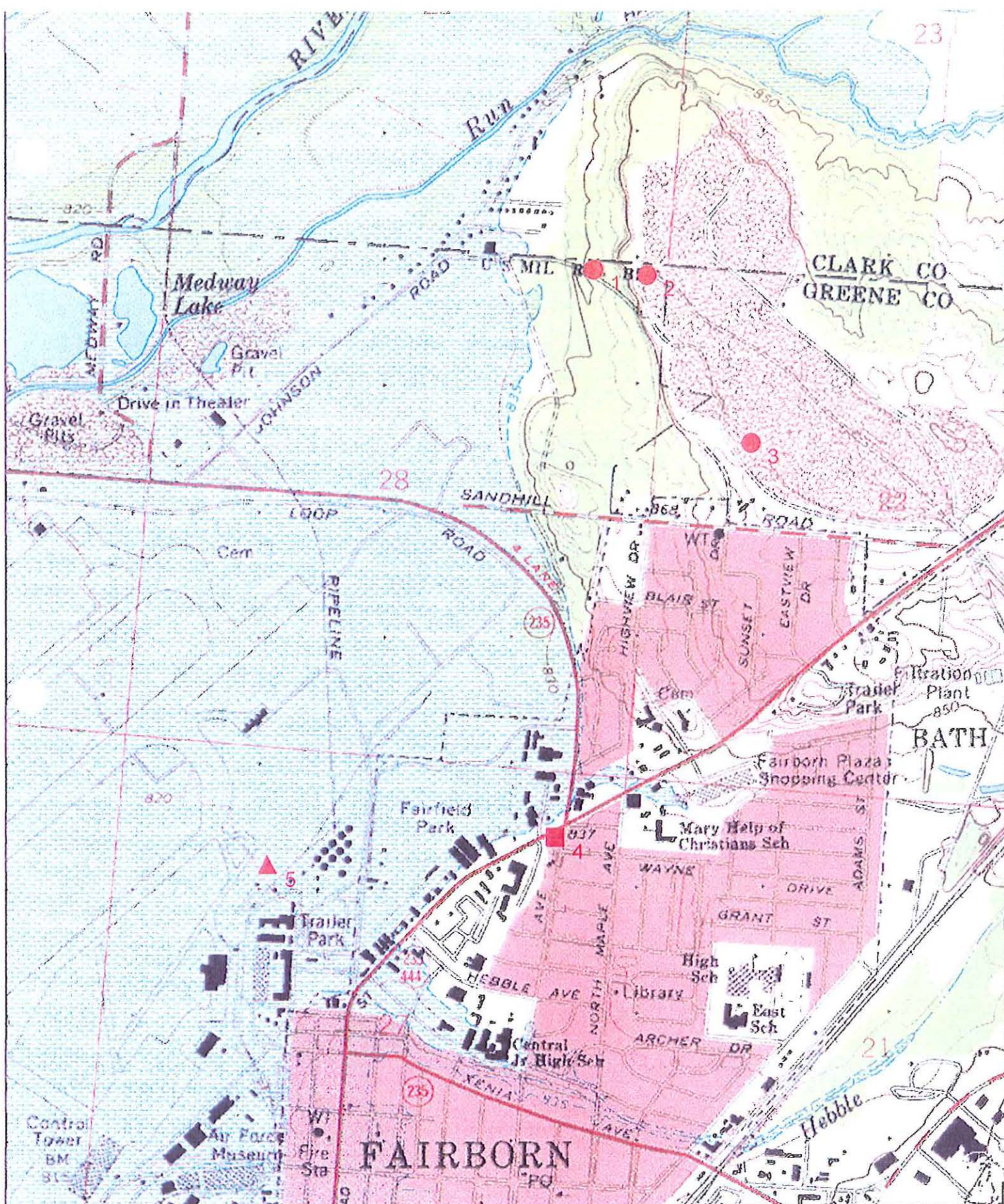
There are no existing or proposed state nature preserves or scenic rivers at the project site. We are also unaware of any unique ecological sites, geologic features, breeding or non-breeding animal concentrations, champion trees, or state parks, forests or wildlife areas in the project vicinity.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas. Also, we do not have data for all Ohio wetlands. For additional information on wetlands and National Wetlands Inventory maps, please contact Jim Given in the Division of Real Estate and Land Management at 614-265-6770.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

Debbie Woischke, Data Specialist  
Support Services Group



Name: FAIRBORN

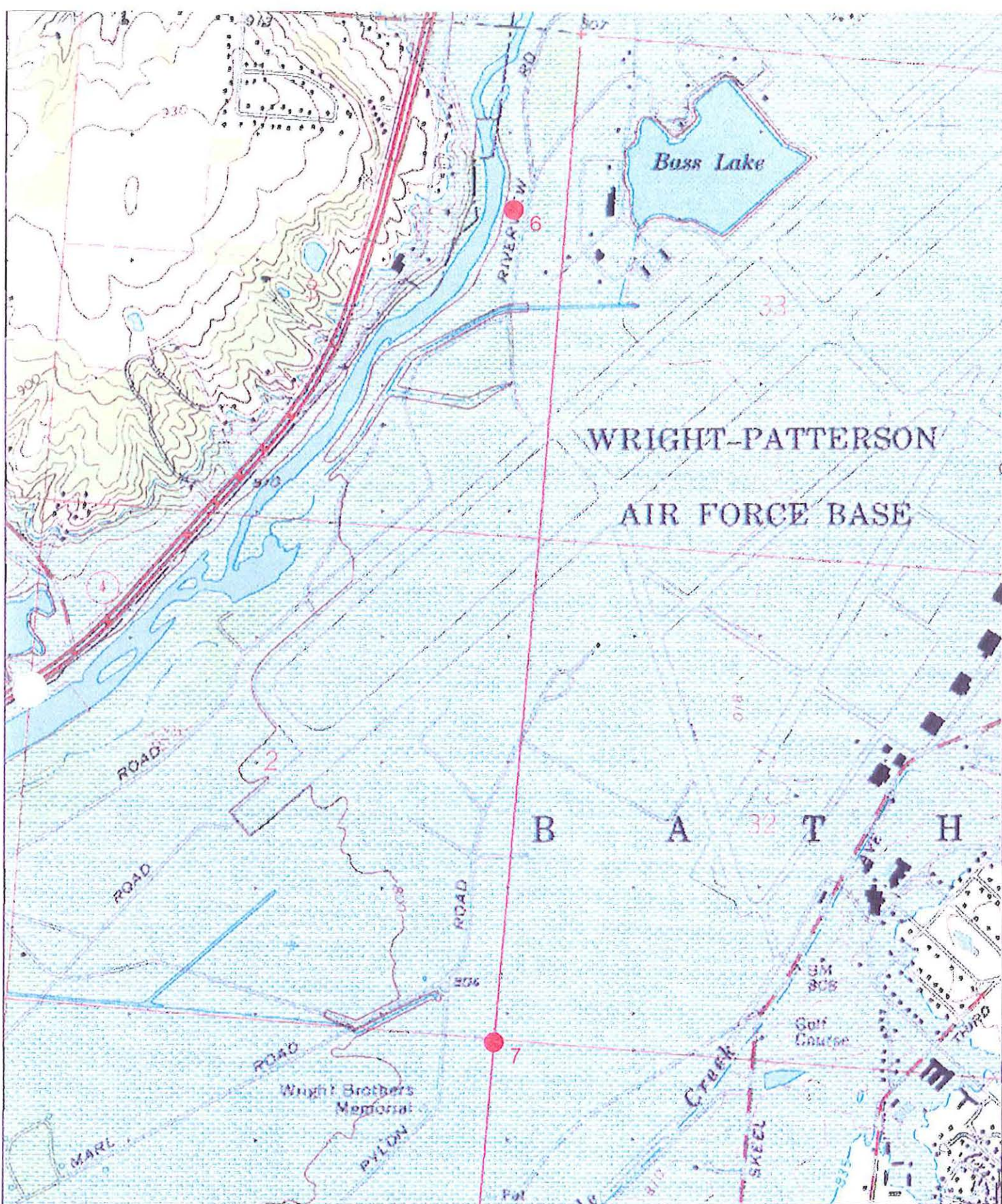
Date: 12/18/101

Scale: 1 inch equals 1333 feet

Location: 039° 50' 17.8" N 084° 01' 17.5" W

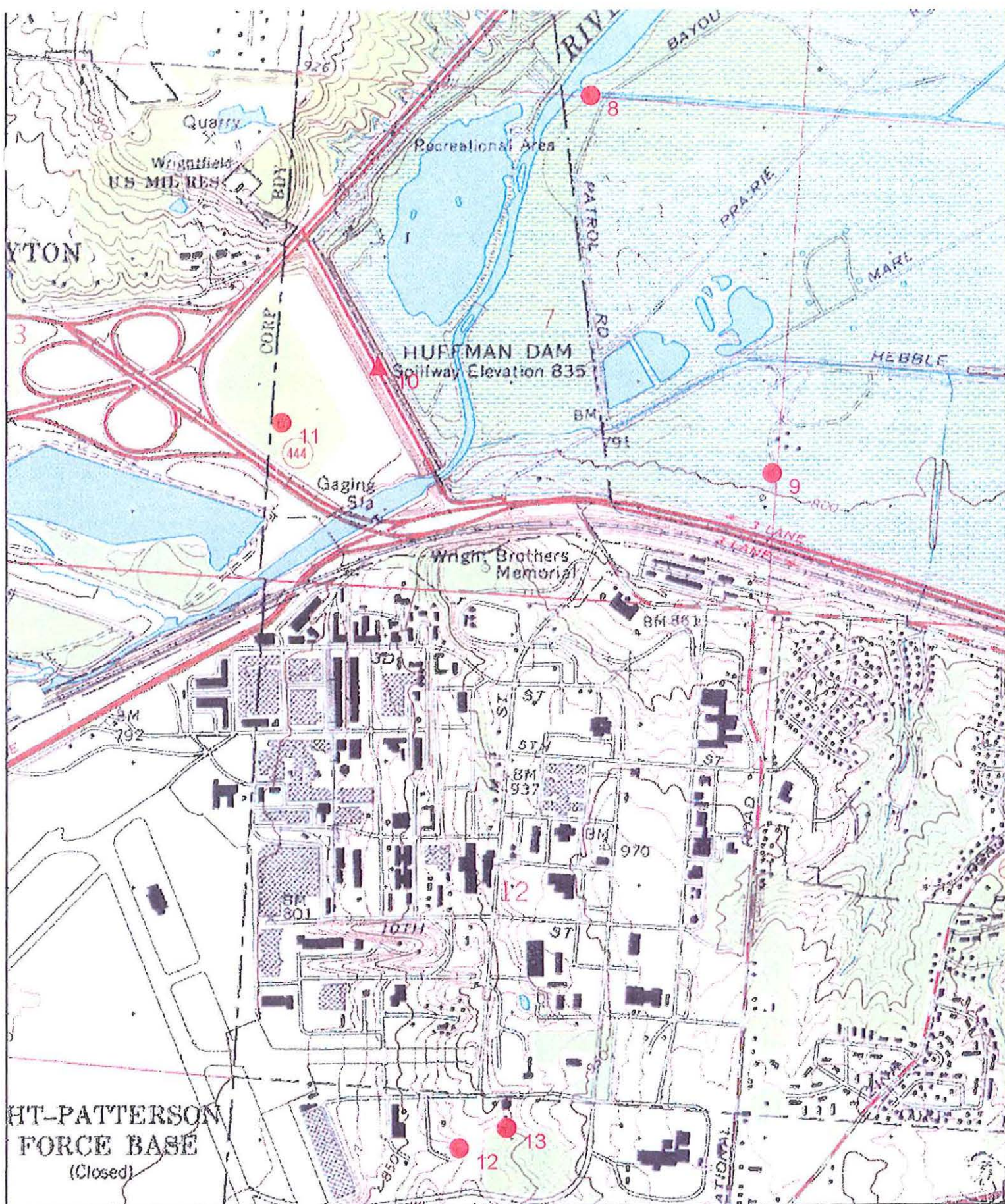
Caption: BHE Environmental, Inc.;

Wright-Patterson Air Force Base Glideslope EA



Name: FAIRBORN  
 Date: 12/18/101  
 Scale: 1 inch equals 1333 feet

Location: 039° 49' 09.3" N 084° 03' 29.3" W  
 Caption: BHE Environmental, Inc.;  
 Wright-Patterson Air Force Base Glideslope EA



Name: FAIRBORN

Date: 12/18/101

Scale: 1 inch equals 1333 feet

Location: 039° 47' 36.7" N 084° 05' 16.5" W

Caption: BHE Environmental, Inc.;

Wright-Patterson Air Force Base Glideslope EA

OHIO DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF NATURAL AREAS AND PRESERVES

December 18, 2001

Wright-Patterson Air Force Base Glideslope EA

**FAIRBORN QUAD**

1. *Carex crawei* - Crawe's Sedge, potentially threatened
2. *Onosmodium hispidissimum* - False Gromwell, potentially threatened  
*Spiranthes magnicamporum* - Great Plains Ladies'-tresses, potentially threatened
3. *Spiranthes magnicamporum* - Great Plains Ladies'-tresses, potentially threatened
4. *Carex mesochorea* - Midland Sedge, threatened
5. *Bartramia longicauda* - Upland Sandpiper, threatened
6. *Juglans cinerea* - Butternut, potentially threatened
7. Huffman Prairie  
*Cistothorus platensis* - Sedge Wren, endangered  
*Papaipema beeriana* - Beer's Noctuid, endangered
8. *Myotis sodalis* - Indiana Bat, federal endangered, state endangered
9. *Sistrurus catenatus* - Eastern Massasauga, endangered
10. *Sistrurus catenatus* - Eastern Massasauga, endangered
11. *Onosmodium hispidissimum* - False Gromwell, potentially threatened
12. *Vitis cinerea* - Pigeon Grape, potentially threatened
13. *Vitis cinerea* - Pigeon Grape, potentially threatened



# Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

## Ohio Division of Wildlife

Office of the Chief  
2045 Morse Rd., Bldg. G  
Columbus, OH 43229-6693  
Phone: (614) 265-6300

April 19, 2011

William Scoville  
Shaw Env. & Infrastructure, Inc.  
5050 Section Ave.  
Cincinnati, OH 45212

Dear Mr. Scoville:

I have reviewed our Biodiversity Database for the Wright-Patterson Air Force Base Glide Slope and Clear Zone Obstruction Removal project area, including a one mile radius, at the Sandhill, Riverview and Wright Memorial Areas in Bath Township, Greene County, and on the Fairborn Quad. The numbers/letters on the list below correspond to the areas marked on the accompanying map. Common name, scientific name and status are given for each species. Status codes are defined as: E=endangered, T=threatened, P=potentially threatened, SC=species of concern and FE=federal endangered.

### Sandhill Area

1. *Exoglossum laurae* – Tonguetied Minnow, T
2. *Spiranthes magnicamporum* – Great Plains Ladies'-tresses, P  
*Agalinis auriculata* – Ear-leaved-foxglove, E
3. *Spiranthes magnicamporum* – Great Plains Ladies'-tresses, P
4. *Myotis sodalis* – Indiana Bat, E, FE
5. *Bartramia longicauda* – Upland Sandpiper, T
6. *Carex mesochorea* – Midland Sedge, E

### Riverview Area

- A. Huffman Metro Park – Five Rivers Metro Parks (several parcels)
  - B. Dayton Aviation Heritage National Historical Park – US National Park Service
1. *Myotis sodalis* – Indiana Bat, E, FE (several locations)
  2. *Cistothorus platensis* – Sedge Wren, SC  
*Papaipema beeriana* – Beer's Noctuid, E

### Wright Memorial Area

- A. Huffman Metro Park – Five Rivers Metro Parks (several parcels)
1. *Myotis sodalis* – Indiana Bat, E, FE (several locations)

William Scoville  
April 19, 2011  
Page 2

In addition to the species given in the list above, there is a record for the Eastern Massasauga (*Sistrurus catenatus*), a state endangered and Federal candidate species, within your project study area. Please be aware that we do not give out specific location data for this sensitive species so it is not included in the list above or shown on any of the maps. Throughout much of its range in the eastern United States, Eastern Massasaugas are found in wet prairies, sedge meadows, and early successional fields. Preferred wetland habitats are marshes and fens. They avoid open water and seem to prefer the cover of broad-leaved plants, emergents, and sedges. Natural succession of woody vegetation is a leading cause of recent habitat deterioration throughout its range. Intensive management to retard woody vegetation growth is necessary to maintain suitable habitat conditions. If the appropriate habitat is within your project area, we request that you consult a professional herpetologist (approved by the Division of Wildlife) to determine whether a survey for this species needs to be performed. If the herpetologist determines that the presence of the Eastern Massasauga is highly unlikely, the project is not likely to have a negative impact to the species.

I have also performed a search for the Indiana Bat (*Myotis sodalis*, state endangered, federal endangered) within a five mile radius of the project site. The results are shown on the attached map.

We are unaware of any geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests or national wildlife refuges, parks or forests within a one mile radius of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas.

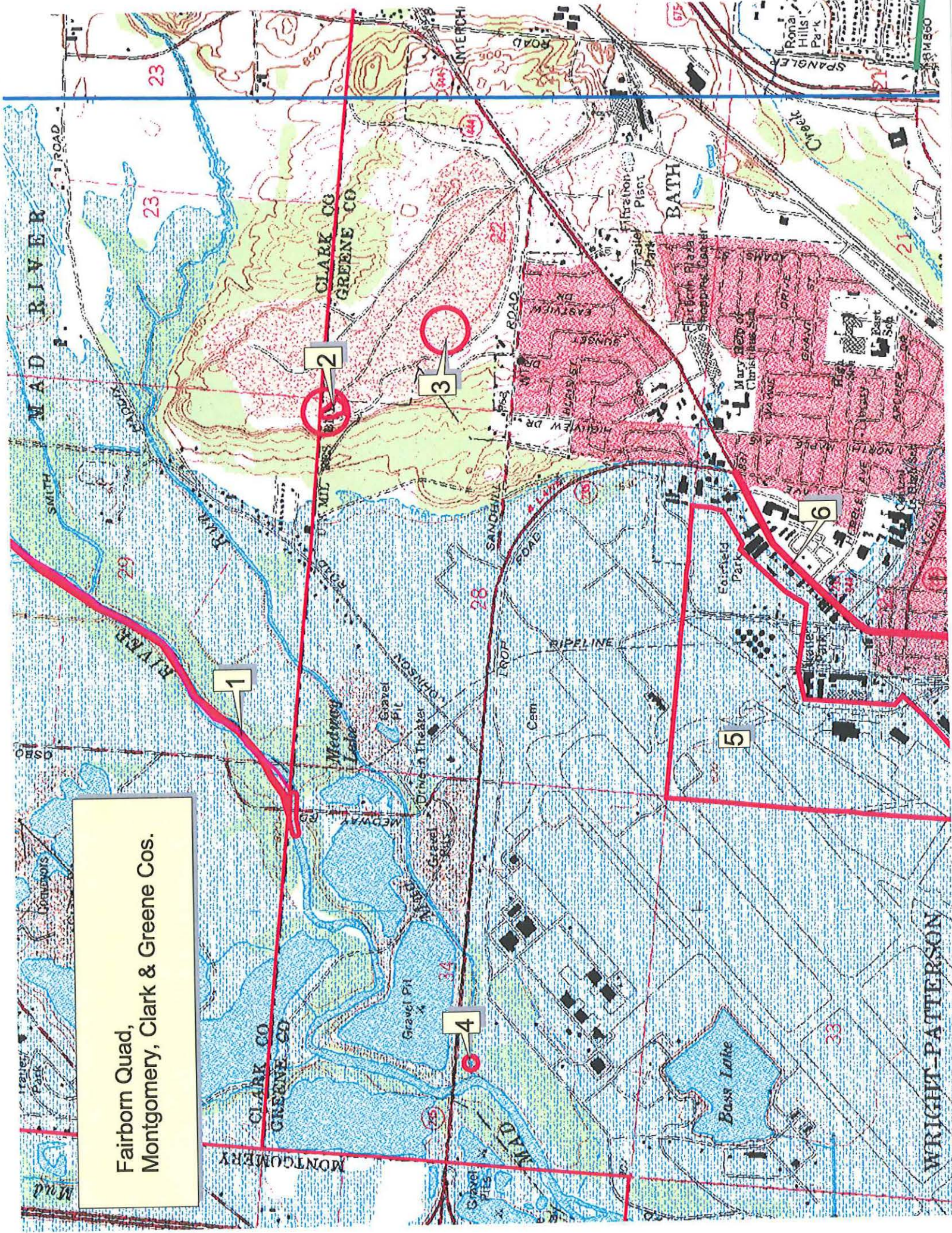
Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,



Debbie Woischke, Ecological Analyst  
Ohio Biodiversity Database Program

Fairborn Quad,  
Montgomery, Clark & Greene Cos.



WRIGHT-PATTERSON

Fairborn Quad,  
Greene Co.

WRIGHT PATTERSON  
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U.S. MIL RES

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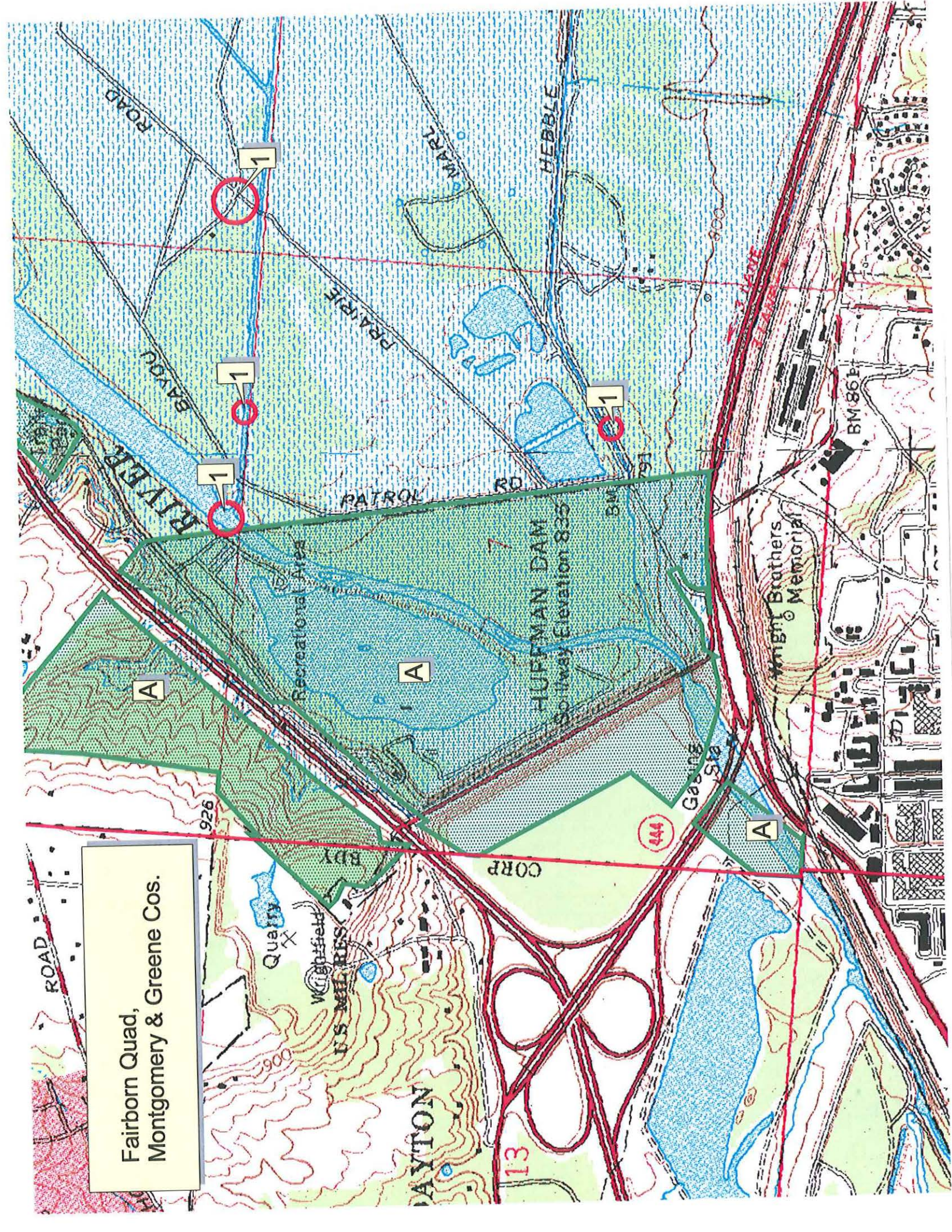
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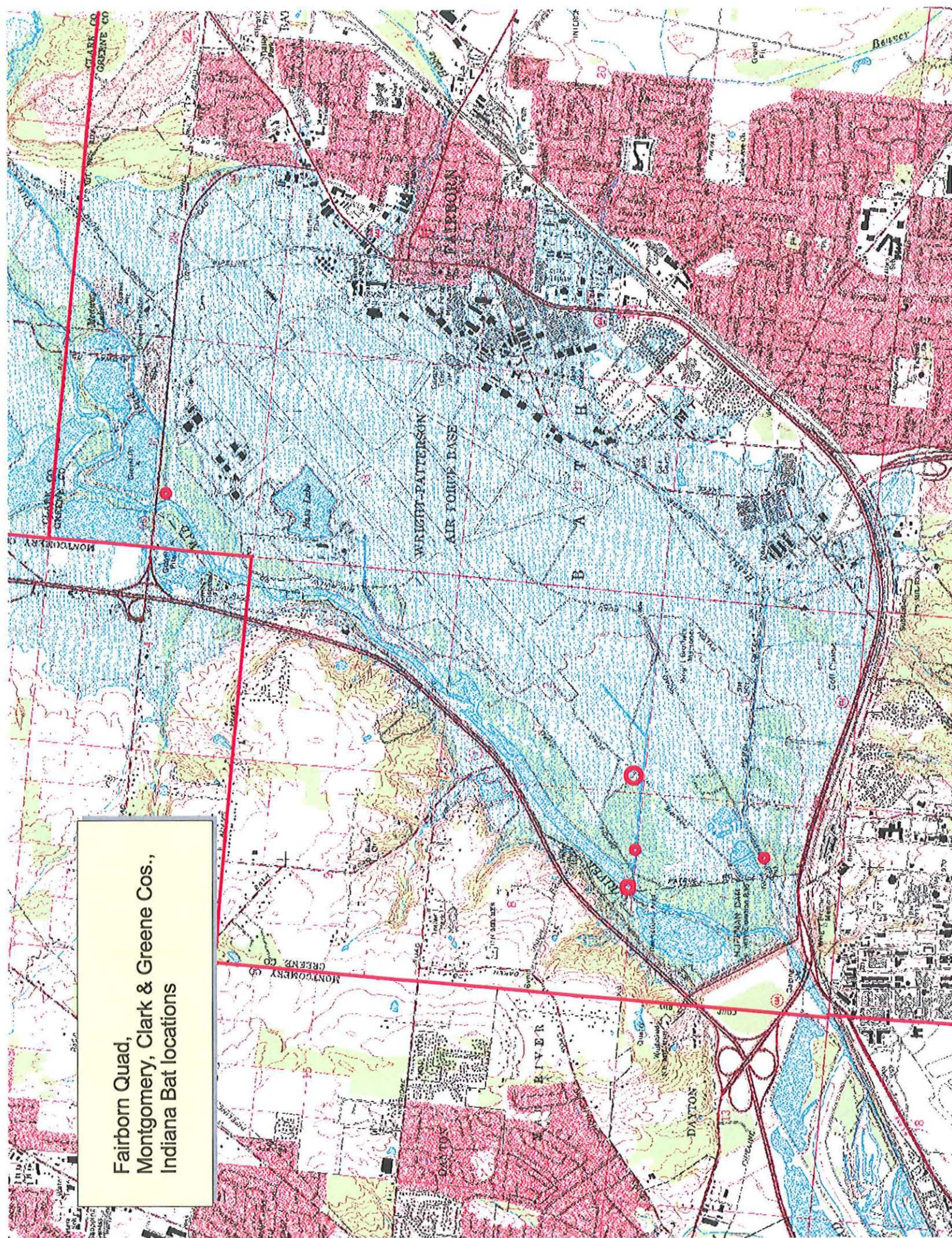
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Fairborn Quad,  
Montgomery & Greene Cos.



Fairborn Quad,  
Montgomery, Clark & Greene Cos.,  
Indiana Bat locations



***Ohio Historic Preservation Office Consultation Letters:***

- 1. WPAFB Request – 20Jun11**
- 2. OHPO Response – 20Jul11**



## DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

20 June 2011

88 ABW/CEANQ  
1450 Littrell Road  
Wright-Patterson AFB OH 45433-5209

Mr. Mark Epstein  
Department Head, Resource Protection & Review  
Ohio Historic Preservation Office  
1982 Velma Ave  
Columbus OH 43211-2497

Dear Mr. Epstein

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) to address vegetative obstructions in the glide slope, transitional area, and clear zones (CZs) of the air base runways. WPAFB is located in Greene County, adjacent to the city of Fairborn, Ohio (see Attachment 1). Air Force Manual (AFMAN) 32-1123(I) (USAF 1999), Airfield and Heliport Planning and Design, requires removal of airspace obstacles to uphold safe standards for airfields. The primary purpose of this project is to protect human health and safety by removing and pruning vegetation from 19 identified sites that obstruct the primary surface area, CZs, transitional areas, and glide slope areas for Runways 23R and 23L at WPAFB. It is our opinion that the proposed project will have No Adverse Effect on properties listed on or eligible for listing on, the National Register of Historic Places. In accordance with 36 CFR 800.11(e), we are submitting the following documentation.

Description of the undertaking. Specifically, this Undertaking proposes the following: The 88 ABW/CE is proposing to remove woody vegetation to ground level in all CZs, transitional areas, and glide slopes except at the Wright Memorial area (Treatment Site A), which would only involve tree pruning. The CZ's, transitional areas, and glide slopes of the two runways constitute the Area of Potential Effects (APE) for this project (Attachment 1). Treatments in the Riverview and Sandhill areas would involve mechanized cutting with the use of appropriate tree removal equipment (e.g., shearer, knuckle boom loader with disk saw, chainsaw). An aggressive approach would be taken to remove all vegetation to ground level, especially those species expected to grow to unacceptable heights in short periods of time. Vegetation within CZs, transitional areas, and glide slopes (except within Treatment Site A) would be eliminated using appropriate eradication techniques (e.g., cutting of woody plants to ground level followed by chemical application to exposed woody tissue) following removal. Vegetation in the glide slope at Treatment Site A would be carefully pruned to 10 ft below the Approach-Departure Clearance Surface (ADCS) zone of the glide slope to maintain a park-like

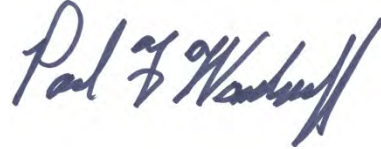
memorial setting using “drop crotch” (cutting resulting in a more natural appearance, increasing the time before pruning is needed again) pruning methods on less than 20 trees surrounding the Wright Memorial. The Wright Memorial area treatment method would involve only a chainsaw or other appropriate pruning equipment. Cut woody material within all treatment sites (except Site A at the Wright Memorial), would be chipped and distributed over treated areas to a depth of 2 inches followed by application of topsoil and seeding with a perennial grass mix to control erosion. Excess wood chips would be properly disposed of off-base. Stumps remaining in all treatment sites would not be removed. Cuttings from Site A would be transported off-base to an approved area for disposal.

Description of steps taken to identify historic properties. As part of the Integrated Cultural Resources Management Plan for Wright-Patterson Air Force Base, surveys have been conducted encompassing the entire base to locate historic and prehistoric archaeological sites (see ICRMP May 2006). The APE for the Proposed Action includes archaeological resources and structures located in the Wright Memorial, Riverview, and Sandhill areas. According to the information documented in the ICRMP, there is one known prehistoric archaeological site listed on the NRHP and located in the immediate project area at the Wright Memorial. In addition, there are several prehistoric and historic archaeological sites located within the project area; however, based on integrity and disturbed nature and location of these sites, they were listed as ineligible for the NRHP. Information pertaining to the archaeological sites previously surveyed is presented in the cultural resources excerpt from the draft EA (Attachment 2).

Description of the undertaking’s effects on historic properties. The historic and prehistoric archaeological sites that fall within the APE have previously been determined to be ineligible for listing on the NRHP through Phase II surveys of the sites. The prehistoric archaeological site that is listed on the NRHP existing at Wright Memorial (see Attachment 3), would not be adversely affected by the pruning of less than 20 trees in and around the site. Pruning of the trees would be accomplished with chain saws and other appropriate tools, thus eliminating the need for use of heavy equipment in the area of the archaeological site. The pruning proposed would be done in such a way that it would result in a more natural appearance, thus not affecting the park like setting of the Memorial. Therefore, it is our opinion that the proposed project will have no adverse effect on historic properties.

Please review the information we have provided and let us know whether you concur with the no adverse effect determination. Should you have questions, I can be reached at 937-257-1374, or via email at [paul.woodruff@wpafb.af.mil](mailto:paul.woodruff@wpafb.af.mil).

Sincerely

A handwritten signature in blue ink that reads "Paul Woodruff". The signature is written in a cursive style with a large initial "P" and a stylized "W".

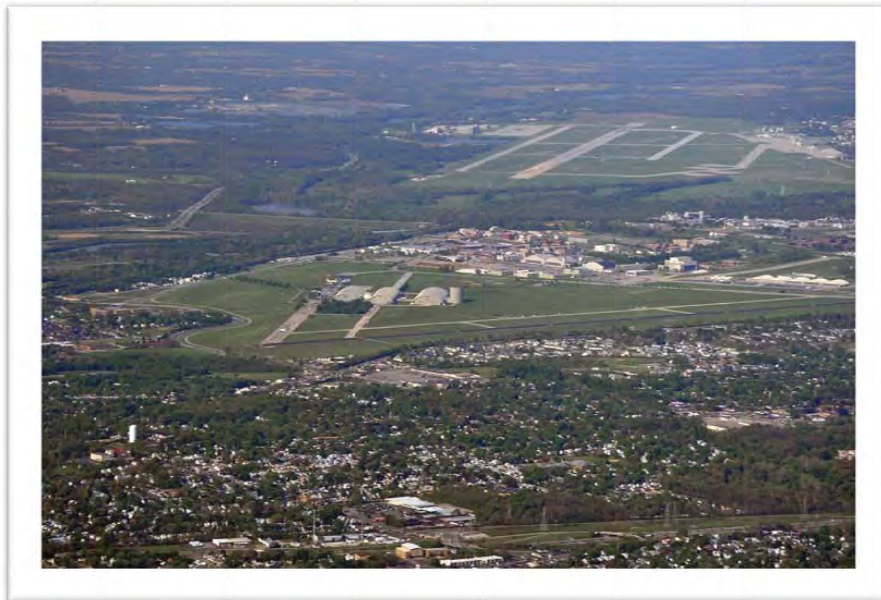
Paul Woodruff  
Cultural Resources Manager  
Environmental Quality Section  
Environmental Branch

Attachments:

1. Project Mapping
2. Glide Slope EA Excerpts, April 2011
3. OAI & OHI Forms for Wright Memorial

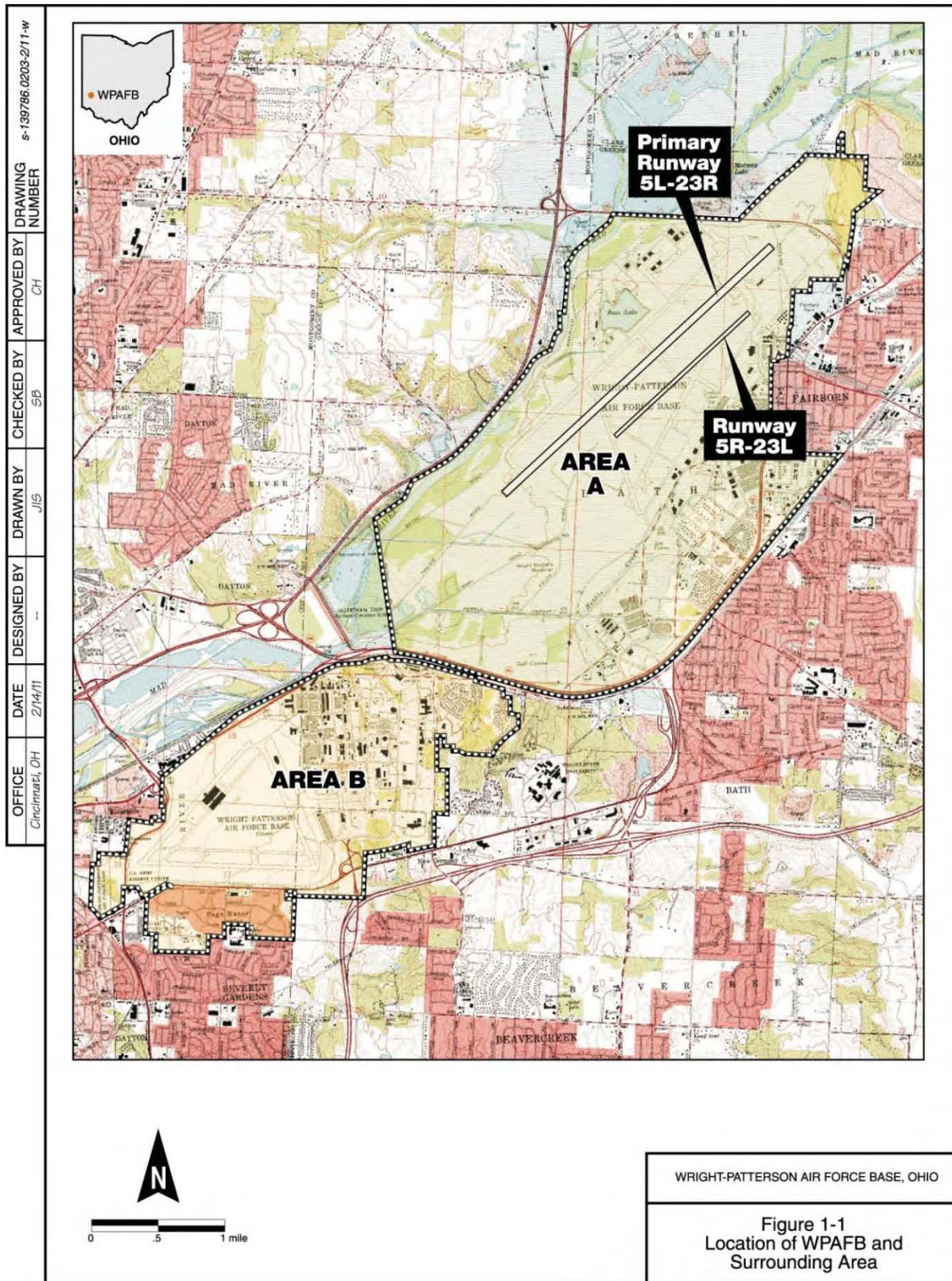
***DRAFT***  
**ENVIRONMENTAL ASSESSMENT**  
**REMOVE GLIDE SLOPE/  
CLEAR ZONE OBSTRUCTIONS**  
**WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

**88<sup>th</sup> AIR BASE WING**

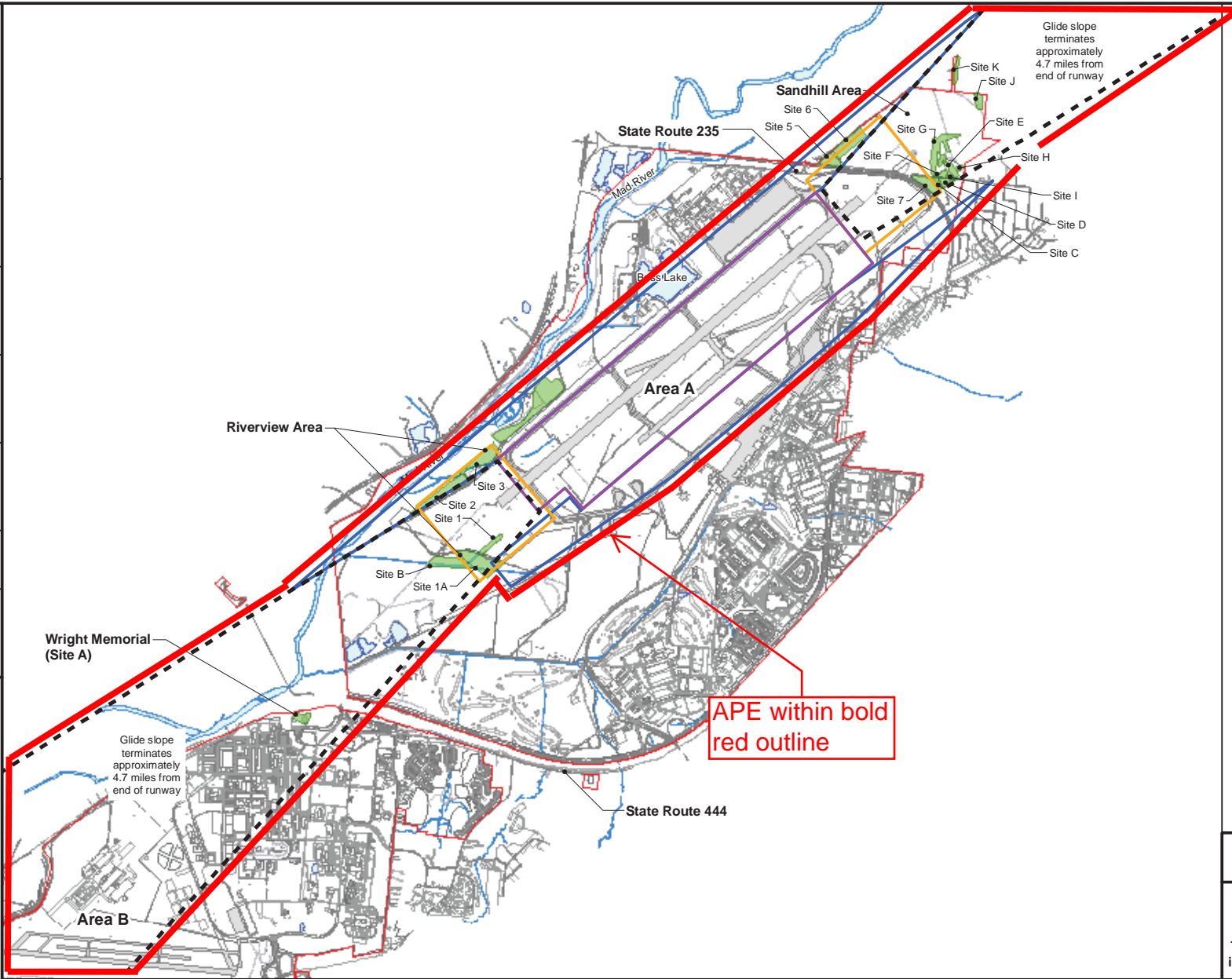


**April 2011**





Notes: L=Left; R=Right



**Legend**

- Glide Slope
- Primary Surface Area
- Clear Zone
- Transitional Area
- Treatment Sites
- WPAFB Base Boundary

N

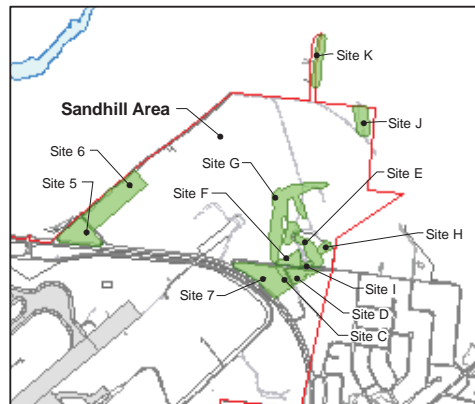
0 1,500 3,000 6,000 Feet

WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

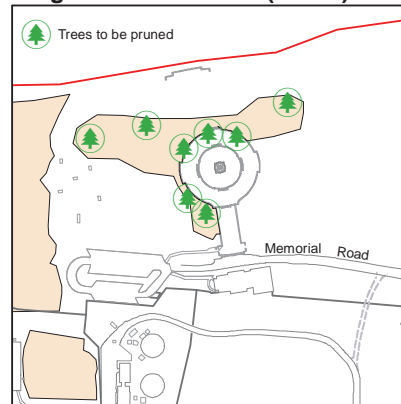
**Figure 1-2**

Orientation of Clear Zone, Glide Slope, Transitional Area, and Primary Surface Area in Relationship to Vegetation Removal Areas

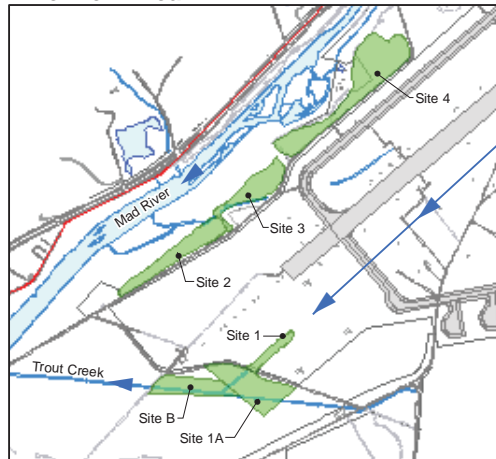
### Sandhill Area



### Wright Memorial Area (Site A)



### Riverview Area



### Legend

- Treatment Sites
- WPAFB Base Boundary
- Existing Tree Vegetation
- Rivers or Streams
- Lakes or Ponds
- Flow Direction



WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

**Figure 1-3**  
**Location of Treatment Sites**

Although bald eagles may be found year round in Ohio, they only occur near WPAFB as rare winter visitors with most recent WPAFB sightings occurring along the Mad River corridor in 1984. During the winter of 2004/2005, one bald eagle was recorded in Greene County, and two in Montgomery County. In the winter of 2005/2006, one bald eagle was observed in Greene County, and no eagles were observed in either Greene or Montgomery Counties during the winter of 2006/2007. Recently, however, a pair of eagles has nested north of Eastwood Metro park/Lake in the vicinity of Rohr's Island well-field, which is west of Gate 1B in Area B, at least one mile west of the Wright Memorial area.

The eastern massasauga rattlesnake is usually found in wet areas including wet prairies, marshes, and low lying areas. Neither the historic nor current population size nor status of massasauga snakes at WPAFB has been determined. Reports of massasauga sightings have been limited to the Prime Base Engineer Emergency Force (Prime BEEF) Training Area and Twin Base Golf Course in Area A, which is within the southern glide slope (WPAFB 2007a). There is no requirement to survey the proposed project areas for potential habitat because the eastern massasauga is a Federal candidate species. However, a survey of the Riverview and Sandhill areas did not encounter evidence of burrows (crayfish or small mammals) occurring within open wetlands for winter hibernation with adjacent upland forests for foraging during the summer. Previous surveys have also reported no sightings of the massasauga rattlesnake within the project areas.

The clubshell is a Federal- and state-listed endangered species occurring in 12 streams in Kentucky, Pennsylvania, Indiana, Ohio, Michigan, and West Virginia. Surveys by 3D/International, Inc. (1998) and BHE Environmental (1999) documented clubshell subfossil remains at the confluence of Trout Creek and the Mad River and near the confluence of Mud Run and the Mad River (WPAFB 2007a). No sightings of the clubshell have been reported within the project areas.

The blazing star stem borer moth is a state-listed endangered species occurring only in disjunct populations throughout the U.S. It is highly dependent upon remnants of mesic tall grass prairies. In 1992, three stem borers were captured at WPAFB's Huffman Prairie. Huffman Prairie is one of three locations where this species has been found in Ohio (WPAFB 2007a). No sightings of the blazing star stem borer have been reported within the project areas.

Consultation with the ODNR, Division of Wildlife was initiated as part of this study to request a search of their Biodiversity Database. A response from the ODNR is pending. Coordination with the ODNR is provided in **Appendix A**.

### **3.7 Cultural Resources**

#### **3.7.1 Definition of the Resource**

As defined by 36 CFR 800.16, historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion, the National Register of Historic Places (NRHP)

maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria. Several Federal laws and regulations govern protection of cultural resources, including the National Historic Preservation Act (NHPA) (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990).

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing) or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., arrowheads and bottles).

Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered for the NRHP. More recent structures might warrant protection if they have potential as Cold War-era resources. Structures less than 50 years in age, and particularly DoD structures in the category of Cold War-era, are evaluated under explicit guidance of the National Park Service Bulletin 22.

The EA process and the consultation process prescribed in Section 106 of the NHPA requires an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's Area of Potential Effect (APE), which is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." In accordance with Section 106 of the NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the SHPO.

The APE for the Proposed Action includes archaeological resources and buildings located in the Wright Memorial, Riverview, and Sandhill areas. According to the Integrated Cultural Resources Management Plan (ICRMP) for WPAFB, there is one known prehistoric archaeological site listed on the NRHP and located in the immediate project area at the Wright Memorial (WPAFB 2006a). In addition, there are several prehistoric and historic archaeological sites located within the project area; however, based on integrity and disturbed nature and location of these sites, were listed as ineligible for the NRHP. For completion, all sites have been summarized below; however, prehistoric archaeological mound sites have been omitted from specific location identification in this report due to Indian tribe concern about revealing locations of religious and cultural sites. Such public information on traditional use areas, such as plant gathering places, ceremonial centers, and burial mounds, could lead to disruption or destruction by curious or ill-intentioned people.

### 3.7.2 Existing Conditions

#### *Wright Memorial Area*

Wright Memorial is considered a historic landscape. Construction on Wright Memorial began in 1938 and dedication ceremonies took place in 1940. Wright Memorial consists of a formal stone plaza area encircled by trees and 27 acres of landscaped grounds. Ownership of the memorial was transferred to the USAF in 1975 (WPAFB 1991). As seen in **Figure 1-3**, the trees proposed to be pruned are in close proximity to the Wright Memorial and are considered a part of the historic landscape.

The Wright Memorial was nominated for listing in the NRHP in 2010 due to its excellent condition and high level of integrity. Because of routine maintenance and minimal alterations, the site has retained essential features necessary to convey its historic identity. The status of the Wright Memorial as a NRHP site is pending.

Three prehistoric archaeological resources were noted in the ICRMP as being located in proximity to the Wright Memorial project area and include the following:

- Site 33 GR 30, known as the Wright Brothers Memorial Mound Group, is located at the Wright Memorial. This site consists of six mounds and has been listed on the NRHP since the 1974. The USAF acquired this property in 1978 from the MCD. Reports indicate the mounds were explored in the 1920s and 1940s; however, there is not much documentation of these efforts. The mounds are located adjacent to the trees in Treatment Site A that are proposed for trimming.
- Site 33 GR 797, a lithic scatter/isolated finds site, is located approximately 3,000 ft east of the southern glide slope boundary. Hardlines Design Company (HDC) conducted evaluative testing of this site in 2002 and determined through coring, a visual reconnaissance, and an examination of historical aerial photographs, that this site was not eligible for the NRHP. No further work was planned and the SHPO concurred with HDC's finding.
- Site 33 GR 923, a lithic debitage with no diagnostics or other tools and soil disturbance, is located approximately 3,000 ft northeast of the Wright Memorial Area. Due to the nature of the soils and the redundant cultural information collected, this site was recommended as ineligible for the NRHP.

Site 33 GR 30 is a known prehistoric archaeological site listed on the NRHP. Sites 33 GR 797 and 33 GR 923 are known sites ineligible for the NRHP based on location of heavy human disturbance and lack of cultural materials.

Six historical archaeological resources were noted in the ICRMP as being located near the Wright Memorial area (**Figure 3-9**) and include the following:

- Site 33 MY 739, identified as a potential historical period location by Earth Tech in 1996; however, was determined ineligible as a NRHP and the SHPO concurred in 1996.
- Sites R7 T2 S12 #6 and R7 T2 S18 #1, identified as disturbed residential-type sites located under parking lots and known ineligible sites.

- Sites R7 T2 S17 #1 and #4, identified as disturbed residential-type sites located within an airfield and known ineligible sites.
- Site R7 T2 S17 #7, identified as a disturbed religious-type site located within an airfield and a known ineligible site.

These historical archaeological resources are known ineligible sites for the NRHP.

#### ***Riverview Area***

Areas southwest of the runways and a small portion of an area near the Mad River were investigated in 1995 and 1999 (WPAFB 2006a). Two prehistoric archaeological resources were noted in the ICRMP as being located in proximity to the Riverview area and include the following:

- Sites 33 GR 919 and 33 GR 920, located approximately 1,500 ft southwest of the Riverview Area, revealed little if any prehistoric or historical cultural material during shovel test pit excavations conducted by the ASC Group, Inc. in 1999. These sites were noted as being greatly disturbed by bulldozing and land clearing. Due to the lack of integrity, it was recommended that these sites were ineligible for the NRHP.

One historical archaeological site was noted within the Riverview Area (**Figure 3-9**) and included the following:

- R8 T2 S2 #8, identified as a disturbed residential-type site and located within an airfield, is a known ineligible site.

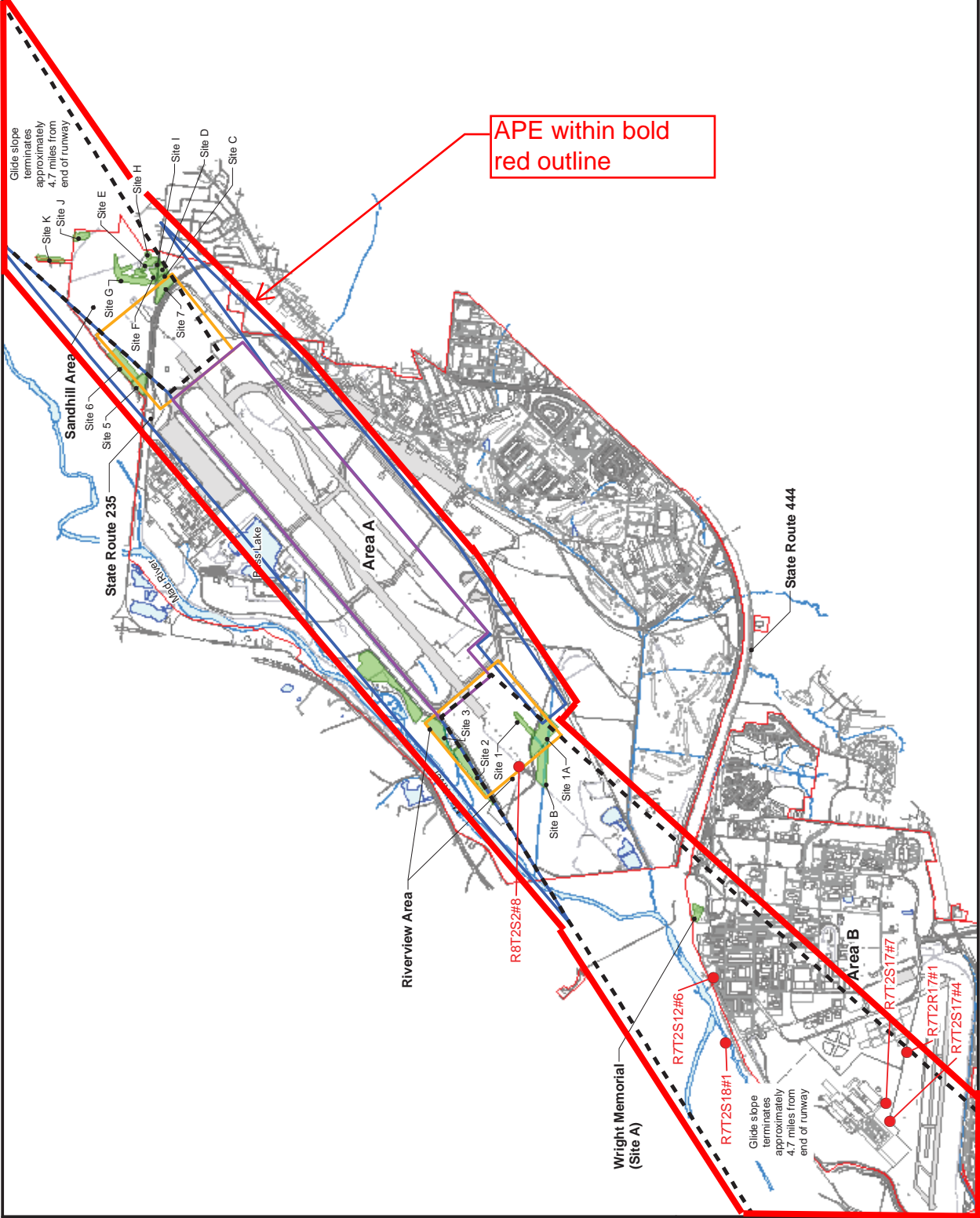
#### ***Sandhill Area***

A small portion of the Sandhill Area was investigated as part of a 1994 and 2004 survey (WPAFB 2006a). One prehistoric archaeological resource was noted in the ICRMP as being located in the Sandhill Area and included the following:

- Site 33 GR 890 was investigated in 1994 and identified artifacts consisting of a secondary flake and a piece of block shatter. Further testing was recommended to determine whether this site may be potentially eligible for the NRHP. The ASC Group, Inc. undertook an investigation of this site in 2004 and determined that the initial artifacts collected in 1994 could have been glacial chert with edge damage caused by plowing. This site was recommended as ineligible for the NRHP and SHPO concurred. This site is located within the boundaries of Treatment Site F in the Sandhill Area.

As part of the IICEP process, WPAFB has initiated consultation with the SHPO. A response from the SHPO is pending and will be included upon receipt.

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	CH	NUMBER
Cincinnati, OH	3/10/11	--	MSH	SB	CH		139786.0303-07.MXD



- Legend**
- Historical Archaeological Site
  - - - Glide Slope
  - ▭ Primary Surface Area
  - ▭ Clear Zone
  - ▭ Transitional Area
  - ▭ Treatment Sites
  - ▭ WPAFB Base Boundary



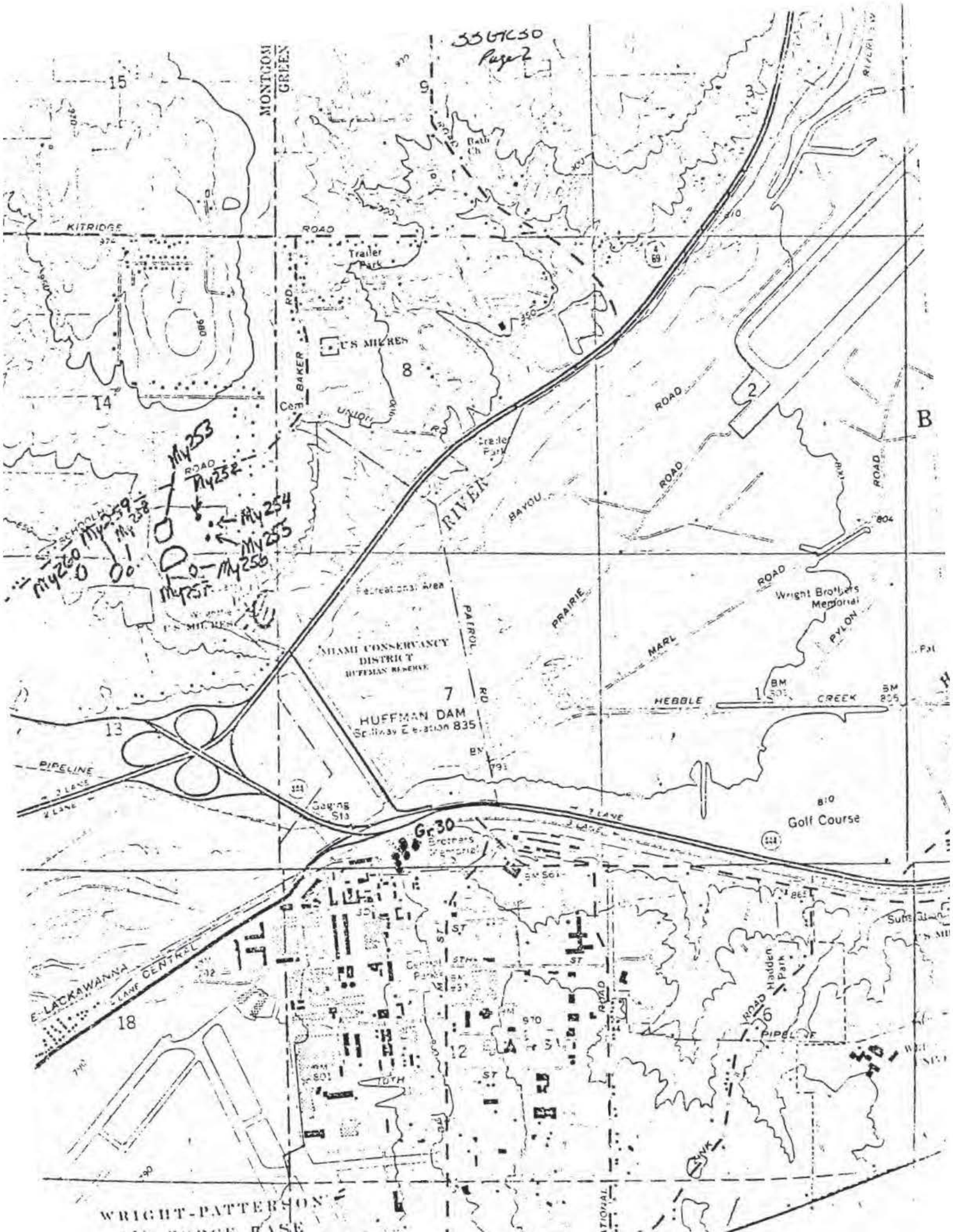
WRIGHT-PATTERSON  
AIR FORCE BASE,  
OHIO

**Figure 3-9**  
Historical Archaeological Resources  
within the Clear Zone, Glide Slope,  
Transitional Area, and Surface Area

# OHIO ARCHAEOLOGICAL INVENTORY

1. Number 3Gr30		4. Site Name Wright Brothers Memorial Mound Group		1. Site No. OHS#33Gr30	2. County Greene	4. Site Name Wright Brothers Memorial Mound Group	5. Other Names For Site WSU#33Gr1
2. County Greene		5. Other Names For Site					
3. Township Beavercreek		WSU#33Gr1					
6. City or Town Fairborn		14. Land Form bluff		23. Ownership: Public <input checked="" type="checkbox"/> Private <input type="checkbox"/> The Miami Conservancy District, 38 Monument Ave., Dayton, Ohio		5. Other Name WSU#33Gr1	
7. Map Reference USGS Fairborn Quad., 7.5' series 1965, 1:24000		15. Elevation ca. 920'-925' AMSL		24. Form Prepared by Jeanne M. Harold			
8. Township & Range Number R. 8N, T. 2E		16. Soil Type Miamian-Eldean-Casco Association		25. Organization Wright State University Regional Archaeological Preservation Office			
9. Section Number SW 1/4, SE 1/4, SW 1/4 of sec. 7		17. Floral Cover grass		26. Location of Negatives WSU Laboratory of Anthropology		5. Other Name WSU#33Gr1	
10. Latitude "		18. Condition of Site good		27. Date of Survey July 7, 1977			
11. Longitude "		19. Present Use Park		28. Survey Conditions excellent			
12. U.T.M. Reference For Middle Mound 49180 4408780 Easting Northing		20. Type of Site 6 mounds		29. Cultural Classification or Time Period Woodland/Adena		5. Other Name WSU#33Gr1	
13. Verbal Site Location Site is: ca. 500 m. NW of 3rd St. & Skyline Dr., ca. 150 m. S of SR 444, and ca. 500 m. of intersection of Kauffman Ave. and Skyline Dr.		21. Drainage System Mad River		30. Artifacts Collected The Dayton Museum of Natural History has artifacts from the site.			
22. Dimensions of Site The mounds vary. They are from 1.7' high and 20' in diameter to 4.2' high and 50' in diameter. (According to National Register Nomination Form)		31. References National Register of Historic Places. United States Army Corps of Engineers 1971 Summary of the Environmental Inventory of Natural, Historical, and Arch. Features: Miami River, Little Miami River and Mill Creek Basins in Southwest Ohio. USACOE.		32. Remarks This site was nominated to the National Register of Historic Places by Stephen C. Koleszar in 1971. The site is within Wright Brothers Memorial Park.			
33. Use opposite side to copy portion of topographic map with site located, attachment of contact print, sketch of site plan, or continuation of items 1-32							

3367630  
Page 2





July 20, 2011

Paul Woodruff, Cultural Resources Manager  
Environmental Quality Section  
Environmental Branch  
88 ABW/CEANQ  
1450 Littrell Road  
Wright-Patterson AFB OH 45433-5209

Re: Remove Glide Slope/Clear Zone Obstructions at WPAFB, OH

Dear Mr. Woodruff,

This is in response to correspondence from your office dated June 20, 2011 (received June 22, 2011) regarding the above referenced undertaking. Comments of the Ohio Historic Preservation Office (OHPO) are offered under provisions of the National Historic Preservation Act of 1966, as amended (16 USC 470 with implementing regulations at 36 CFR 800).

In compliance with Air Force Manual 32-1123(I) (USAF 1999), Airfield and Heliport Planning and Design, Wright-Patterson Air Force Base (WPAFB) proposes to remove woody vegetation to ground level in all Clear Zones, transitional areas and glide slope areas for Runways 23R and 23L, except in Treatment Site A in the Wright Memorial area, for the purpose of protecting human health and safety. In the glide slope for Treatment Site A, proposed work is limited to pruning less than 20 trees surrounding the Wright Memorial to 10' below the Approach-Departure Clearance Surface Zone, which will maintain a park-like setting.

The Area of Potential Effects (APE) for the proposed project includes the Wright Memorial, Riverview and Sandhill areas of WPAFB. Archeological and architectural surveys have been conducted as part of the Integrated Cultural Resources Management Plan. Historic resources determined to be eligible for listing on the National Register of Historic Properties within the APE are the Wright Brothers Memorial Mound Group (NR #74001505) and the Wright Brothers Memorial Monument (Facility 40001), both located within Treatment Site A. The proposed work in this treatment site is limited to pruning less than 20 trees, which will not require the use of heavy equipment that has the potential to disturb archeological sites. In addition, the proposed work will not alter the character of the designed landscape surrounding the historic monument.

Based on the information presented, I concur that the proposed project will have no adverse effect to historic properties. No further coordination is required unless there are changes to the project scope. In such a situation, this office should be contacted as per 36 CFR Section 800.13.

If you have any questions, please contact me by phone at (614) 298-2000 or by email at [jbertram@ohiohistory.org](mailto:jbertram@ohiohistory.org). Thank you.

Sincerely,

Jamie Bertram, Project Reviews Manager  
Resource Protection and Review

OHIO HISTORICAL SOCIETY

Ohio Historic Preservation Office

1982 Velma Avenue, Columbus, Ohio 43211-2497 ph: 614.298.2000 fx: 614.298.2037  
[www.ohiohistory.org](http://www.ohiohistory.org)

OHPO Serno #1039393

***Dayton Daily News Questions/Answers***

## **Dayton Daily Questions for Glideslope EA:**

Q1: Where can I find a copy of the EA?

A: A Copy of the EA is in the Fairborn Library;

Q2: What is the estimated cost?

A: The Glide Slope Corridor work is included in an overall MILCON Primary Runway Replacement project. The glide slope portion is projected to cost between \$1M-\$3M. Since the project has not been bid, in order to obtain the lowest bill for the taxpayer, we cannot release our government estimate.

Q3: How will the work be done?

A: The work will be done by a combination of contractor and base persons.

Q4: When is the project scheduled to be executed?

A: The projected schedule is undetermined at this time, as the project is contingent upon congressional authorization and appropriation.

Q5: When was the last glideslope obstruction project?

A: The last glideslope trimming/clearing was completed in 2002. Similar work in the east/west clear zones has been performed since, but not in the actual glideslope.

***Appendix B***  
***Site Photographs***

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER	s-139786.0303-4/11-w
Cincinnati, OH	4/4/11	--	JIS	SB	CH		



1. South view of open field in the Riverview Area, south of Symmes Road.



2. East view of area near the Boy Scout Camp, in the Riverview Area, west of Riverview Road.

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3. North view of Wright Memorial Area.



4. South view of Wright Memorial Area.

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER	s-139786.0303-4/11-w
Cincinnati, OH	4/4/11	--	JIS	SB	CH		



5. East view of Sandhill Area, east of Haddix Road.



6. South view of Sandhill Area.

***Appendix C***

***Clean Air Act***  
***General Conformity Analysis***

WPAFB  
Environmental Assessment  
Wood Chip Handling Operations

**Intent:** To calculate estimated emissions from wood chipper operations.

**Description:** The cut wood material, with the exception of Treatment Site A is proposed to be chipped using a chipper. Fugitive dust (PM10) is generated during these handling operations from residual particulate that clings to the wood chips from chipping operations (i.e. sawdust content). The maximum potential emissions have been calculated based on the maximum theoretical amount of wood chipped.

**Method:** Emissions from chip handling operations are calculated using an emission factor developed by the National Council for Air and Stream Improvement (NCASI) and published in Technical Bulletin #424. The NCASI emission factor and the amount(s) of chips handled have been used to calculate emissions from the wood chip handling operations. The emissions from the chipper engine operations have been calculated using AP-42 large diesel engine emission factors.

Chipping:		Notes:
Sawdust Emission Factor (lb PM/ton sawdust)	1	NCASI #424, Table 28, Pg. 66
Sawdust Content of Wood Chips (lb sawdust/ton chips)	20	Engineering estimate
Maximum Capacity of Wood Chipper (tons/hr)	60	Typical wood chipper estimate
Maximum Hours of Operation (hr/yr)	720	Maximum hours of operation
Chipper Engine:		
Engine Rated Capacity (horsepower)	750	Typical wood chipper estimate
Fuel Consumption Rated Capacity (gal/hr)	38.32	@ 7,000 BTU/hp-hr and 137,000 BTU/gal
Maximum Hourly Heat Input (MMBTU/hr)	7	@ 7,000 BTU/hp-hr, 75% eff. and 260 horsepower
Maximum Annual Heat Input (MMBTU/yr)	5040	@ 7,000 BTU/hp-hr, 936 hr/yr, 75% eff. and 260 horsepower

Pollutant	Chip Conveyance		EF	Diesel Engine Emissions		Total	
	lb/hr	ton/yr	lb/hp-hr	lb/hr	ton/yr	lb/hr	ton/yr
	a	b	c	d	e	f	g
PM	0.6	0.22	0.0007	0.53	0.19	1.13	0.41
SO <sub>2</sub>	-	-	0.000243	0.18	0.07	0.18	0.07
NO <sub>x</sub>	-	-	0.024	18.00	6.48	18.00	6.48
CO	-	-	0.0055	4.13	1.49	4.13	1.49
VOC (TOC)	-	-	0.000705	0.53	0.19	0.53	0.19

Notes

a= (Capacity of Wood Chipper) X (Sawdust Content of Wood Chips) X (Sawdust EF) / (2000 lb/ton)

b= a X (720 hr/yr) / (2000 lb/ton)

c= AP-42 Table 3.4.1 for Large Diesel Stationary Engines

d= c X (Engine Capacity)

e= d X (720 hr/yr) / (2000 lb/ton)

f= a + d

g= b + e

## ***Appendix D***

### ***Noise Terminology and Analysis Methodology***

This Appendix presents a detailed discussion of noise and its effects on people and the environment. An assessment of aircraft noise requires a general understanding of how sound is measured and how it affects people in the natural environment. The purpose of this appendix is to address public concerns regarding aircraft noise impacts.

Section D.1 is a general discussion on the properties of noise. Section D.2 summarizes the noise metrics discussed throughout this Environmental Assessment (EA). Section D.3 provides Federal land use compatibility guidelines that are used in applying aircraft noise impacts to land use planning in the airport environment.

## **D.1 GENERAL**

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only source of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise, and typically are singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon, and consists of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant or unpleasant depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics, intensity and frequency. The intensity is a measure of the strength or amplitude of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder is the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are 1,000,000,000,000 times larger than those of sounds which can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB, and}$$

$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$$

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB}$$

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as “decibel addition” or “energy addition.” The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average Sound Level (DNL). Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

The minimum change in the time-average sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound’s loudness, and this relation holds true for loud sounds and for quieter sounds.

Sound frequency is pitch measured in terms of hertz (Hz). The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. To account for the varied frequency sensitivity of people, we use the A-weighted scale that approximates the average, healthy human ear. The A-weighting de-emphasizes the low and high frequency portion of the noise signal and emphasizes the mid-frequency portion. Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis documents deal only with A-weighted sound levels, the adjective “A-weighted” is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms “sound level” and “A-weighted sound level” or by the units dB, dBA, and dB(A). The A-weighting function de-emphasizes higher and especially lower frequencies to which humans are less sensitive. Because the A-weighting is closely related to human hearing characteristics, it is appropriate to use A-weighted sound levels when assessing potential noise effects on humans and many terrestrial wildlife species. In this document, all sound levels are A-weighted and are reported in dB.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common: 1 second and 1/8 of a second. A measured sound level averaged over 1 second is called a slow response sound level; one averaged over 1/8 of a second is called a fast response sound level. Most environmental noise studies use slow response

measurements, and the adjective “slow response” is usually omitted. It is easy to understand why the proper descriptor “slow response A-weighted sound level” is usually shortened to “sound level” in environmental impact analysis documents.

## **D.2 NOISE METRICS**

A “metric” is defined as something “of, involving, or used in measurement.” As used in environmental noise analyses, a metric refers to the unit or quantity that measures or represents the effect of noise on people. Noise measurements typically have involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics. Recently, however, various Federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analyses documents, and both the Department of Defense (DOD) and the Federal Aviation Administration (FAA) have specified those which should be used for Federal aviation noise assessments. These metrics are as follows.

### **D.2.1 Maximum Sound Level**

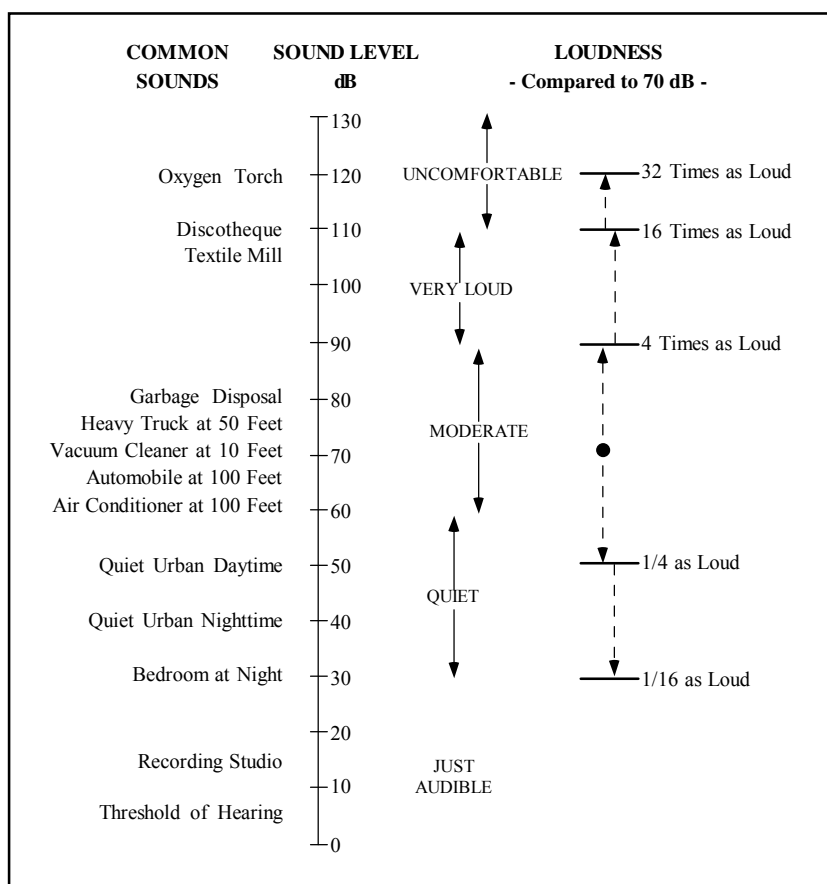
The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM,  $L_{\max}$ , or  $L_{A\max}$ . The typical A-weighted levels of common sounds are shown in Figure D-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

### **D.2.2 Sound Exposure Level**

Individual time-varying noise events have two main characteristics: (1) a sound level which changes throughout the event, and (2) a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The sound exposure level (abbreviated SEL or LAE) combines both of these characteristics into a single metric.

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight is usually greater than the maximum sound level of the overflight.

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level. Because the SEL and the maximum sound level are both A-weighted sound levels expressed in dBs, there is sometimes confusion between the two, so the specific metric used should be clearly stated.



Source: Harris 1979

**Figure D-1. Typical A-Weighted Sound Levels of Common Sounds**

### Day-Night Average Sound Level

Time-average sound levels are the measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the day-night average sound level (abbreviated DNL or  $L_{dn}$ ) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-dB adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10 dB “penalty” represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

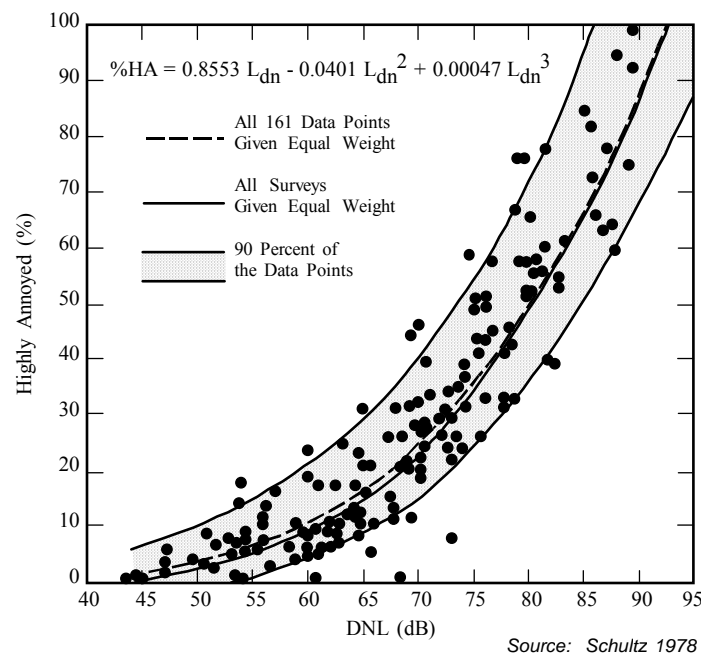
Ignoring the 10 dB nighttime adjustment for the moment, DNL may be thought of as the continuous A-weighted sound level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

DNL provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a DNL of 65 dB could result from a very few noisy events, or a large number of quieter events.

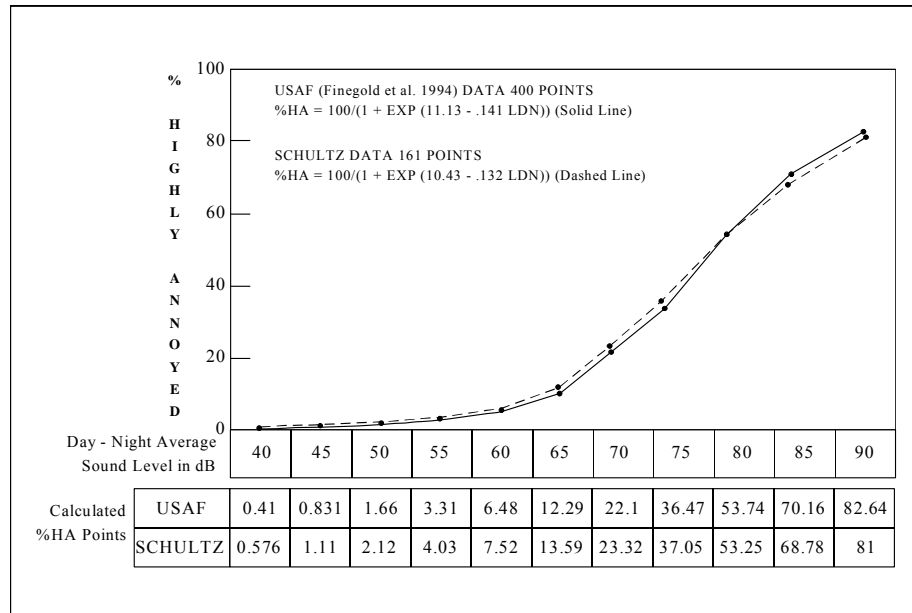
As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have been conducted to appraise community annoyance to all types of environmental noise have found the DNL to be the best measure of that annoyance. Its use is endorsed by the scientific community (American National Standards Institute [ANSI] 1980, 1988; U.S. Environmental Protection Agency [USEPA] 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of DNL. This is illustrated in Figure D-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in DNL.

Figure D-2 is taken from Schultz (1978) and shows the original curve fit. A more recent study has reaffirmed this relationship (Fidell et al. 1991). Figure D-3 shows an updated form of the curve fit in comparison with the original (Finegold et al. 1992). The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.



**Figure D-2. Community Surveys of Noise Annoyance**



Sources: Schultz 1978 and Finegold et al. 1994

**Figure D-3. Response of Communities to Noise and Comparison of Original Schultz 1978 and Current USAF Curve Fits**

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. A National Aeronautics and Space Administration (NASA) study reported the reactions of individuals in a community to daily helicopter overflights, ranging from 1 to 32 per day (Fields and Powell 1985). The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of DNL has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to “meaningless” time-average sound levels.

Time-average noise metric, such as DNL, takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB. Assume, as a second example that 10 such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of events. This is the basic concept of a time-average sound metric, and specifically the DNL.

### **D.3 LAND-USE COMPATIBILITY**

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL. In June 1980, an ad hoc FICUN published guidelines for considering noise in land use planning (FICUN 1980). These guidelines related DNL to compatible land uses in urban areas. The committee was composed of representatives from the DOD, Department of Transportation, Department of Housing and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, Federal agencies have generally adopted these guidelines to make recommendations to the local communities on land use compatibilities.

The FAA included the committee's guidelines in the Federal Aviation Regulations (USDOT 1984). These guidelines are reprinted in Table D-1, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (see Notes in Table D-1), they provide the best means for evaluating noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL ( $L_{dn}$  values) above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions.

In 1990, the FICON was formed to review the manner in which aviation noise effects are assessed and presented. This group released its report in 1992 and reaffirmed the use of DNL as the best metric for this purpose (FICON 1992).

Analyses of aircraft noise impacts and compatible land uses around DOD facilities are normally made using NOISEMAP (Moulton 1992). This computer-based program calculates DNL at many points on the ground around an airfield and draws contours of equal levels for overlay onto land-use maps of the same scale. The program mathematically calculates the DNL of all aircraft operations for a 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, and the time of day (daytime or nighttime) that each operation occurs.

Day-night average sound levels may also be measured directly around an airfield, rather than calculated with NOISEMAP; however, the direct measurement of annualized DNL is difficult and costly since it requires year-round monitoring or careful seasonal sampling. NOISEMAP provides an accurate projection of aircraft noise around airfields.

NOISEMAP also has the flexibility of calculating sound levels at any specified ground location so that noise levels at representative points under flight paths can be ascertained. NOISEMAP is most accurate for comparing "before and after" noise impacts which would result from proposed airfield changes or alternative noise control actions, so long as the various impacts are calculated in a consistent manner.

**Table D-1. Land Use Compatibility Guidelines with Yearly**

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVELS IN DECIBELS					
	BELOW 65	65-70	70-75	75-80	80-85	OVER 85
<b>Residential</b>						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
<b>Public Use</b>						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals & nursing homes	Y	25	30	N	N	N
Churches, auditoria, & concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
<b>Commercial Use</b>						
Offices, business, & professional	Y	Y	25	30	N	N
Wholesale & retail-building materials, hardware, and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
<b>Manufacturing and Production</b>						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic & optical	Y	Y	25	30	N	N
Agriculture (except livestock) & forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming & breeding	Y	Y(6)	Y(7)	N	N	N
Mining & fishing, resource production & extraction	Y	Y	Y	Y	Y	Y
<b>Recreational</b>						
Outdoor sports arenas & spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits & zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, & camps	Y	Y	Y	N	N	N
Golf courses, riding stables, & water recreation	Y	Y	25	30	N	N
<p><b>Key:</b>  Y (Yes) = Land use and related structures compatible without restrictions.  N (No) = Land use and related structures are not compatible and should be prohibited.  NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.  25 or 30 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.</p> <p><b>Notes:</b>  (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements often are stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.  (2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.  (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.  (4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal level is low.  (5) Land-use compatible, provided special sound reinforcement systems are installed.  (6) Residential buildings require an NLR of 25 dB.  (7) Residential buildings require an NLR of 30 dB.  (8) Residential buildings not permitted.</p>						

Source: FAA 1985 and USDOT 1984

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